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MAP PROJECTIONS OF THE ENTIRE SPHERE

By RONALD MILLER, M.A., PH.D.

PHILOSOPHERS once occupied themselves with the problem of squaring the circle : nowadays we devise all-purpose projections of the entire sphere. No doubt, too, it has often been the same joy in operating mathematical processes that has led us to devise some of these projections rather than any strong interest in their use after completion. It is perhaps uncommon for mathematicians to be geographers and geographers mathematicians : too often the calculations involved in projections have scared the geographer away from the subject and left the mathematician to produce graticules which, if of unquestioned elegance, are sometimes by no means best suited to the geographer's purpose. The latter, however, probably cowed by his unfamiliarity with mathematics, has usually bowed to the oracle and accepted. It would seem, therefore, that something might yet be gained were the geographer, with due modesty and temerity, to look at the problem afresh and try to see what he really wants from world projections and what he can reasonably demand or expect from their makers.

First, it is not unprofitable to ask ourselves why we need map projections—a question so basic that it is often overlooked. The immediate answer from most of us would be " to represent the spherical earth on a flat sheet of paper." In so saying, we reveal the ever-present tendency to allow our attention to be focussed on flat sheets of paper—to visit the library rather than the field. Teachers of geography will not require to be reminded how much easier it is, for example, to get a student to read a book than take a field excursion or to study a map which has no accompanying text to provide a ready-made explanation or comment.

Most of us must admit, then, that while we may be aware of it, we tend to overlook the fact that the only genuine representation of the spherical earth is the model globe, and that the real, or at least main, reason for our requiring projections on to a plane is that we often demand maps on a scale larger than that for which globes are practicable. Problems of cost, handling and storage rapidly increase and of course soon develop enormous dimensions for globes with a diameter

greater than some eighteen inches—that is, at a scale of some 1 : 28 million. Do we normally realise, however, that the world, while distorted on to a large wall map say six feet by three, is perfectly represented at the same scale on a globe only some two feet in diameter? that the average hand-atlas world map is on the same scale as a globe the size of a grapefruit? And yet we unashamedly prefer the plane map in each case because it is " more convenient " !

Topographical maps, maps of countries, continents and, in fact, on all scales greater than 1 : 28 million or thereby, must, on the other hand, inevitably be projected on to flat sheets of paper, and we quite properly enlist mathematical aid in this work. For world maps, however, the position is very different, particularly where relationships inherent in the sphericity of the earth are involved. Nothing but the globe can give a true understanding of spatial relationships. The latest fashion in so-called Air-Age maps is the zenithal equidistant,[1, 2] usually in the oblique case, centred on the capital of the user's country or on some other point in which he is particularly interested. For these it is sometimes claimed that they express true spatial relationships, but while they are undoubtedly most useful projections, true space is nothing more or less than true area, which is true length multiplied by true breadth, and of course neither the zenithal equidistant nor any other projection can show all lengths and breadths truly (see Fig. 1).

Since spatial relationships have now become vitally important, not only because of aircraft but vastly more so because of self-propelled projectiles, it is more than ever necessary that we revert to the usage of the scholars of the past and equip ourselves with a globe. Portraits of explorers, navigators, geographers and other philosophers of the past frequently incorporated a globe : libraries formerly regarded a globe as essential furniture and the great atlases devoted a proportionately smaller amount of space than now to world maps. May not the conventional frontispiece, from which this type of publication takes its name, of ATLAS bearing the globe on his shoulders, have been intended as a reminder as well as being decorative? It is significant that with the enormous multiplication of books, and particularly of text-books—*i.e.* potted knowledge—consequent on mass-education, went a relative decline in the production of globes. It cannot be that the objection to them was cost, for just as the price of books fell with mass-production, so would the cost of globes have fallen had there been the demand to justify a similar mass-production of them. The demand, however, was apparently not there, and we can only surmise why—was it because the globe refused to be potted but called for active original thought in the beholder as opposed to the simple absorption of the written word?—or perhaps because spatial relationships were less dominant then, one segment of the world being less inclined to fly at the throats of other segments? Whatever the reason, a return to the globe is now most urgently called for to free us from the welter of projections[3] in which the already intricate questions of world spatial relations have become obscured.

In respect of globes, the Americans, to judge by the catalogues

of their commercial cartographers,[4] are far ahead of us—perhaps because they were more overwhelmed by their variety of world projections. What appear to be handsome physical globes of some twelve inches diameter are offered at reasonable (for U.S.A.) prices in a variety of mountings varying from simple cradles in which the globe rolls freely, allowing it to be viewed in all aspects, to more elaborate mounts on the same principle but incorporating hinged great circle scales which allow distances to be measured in all directions

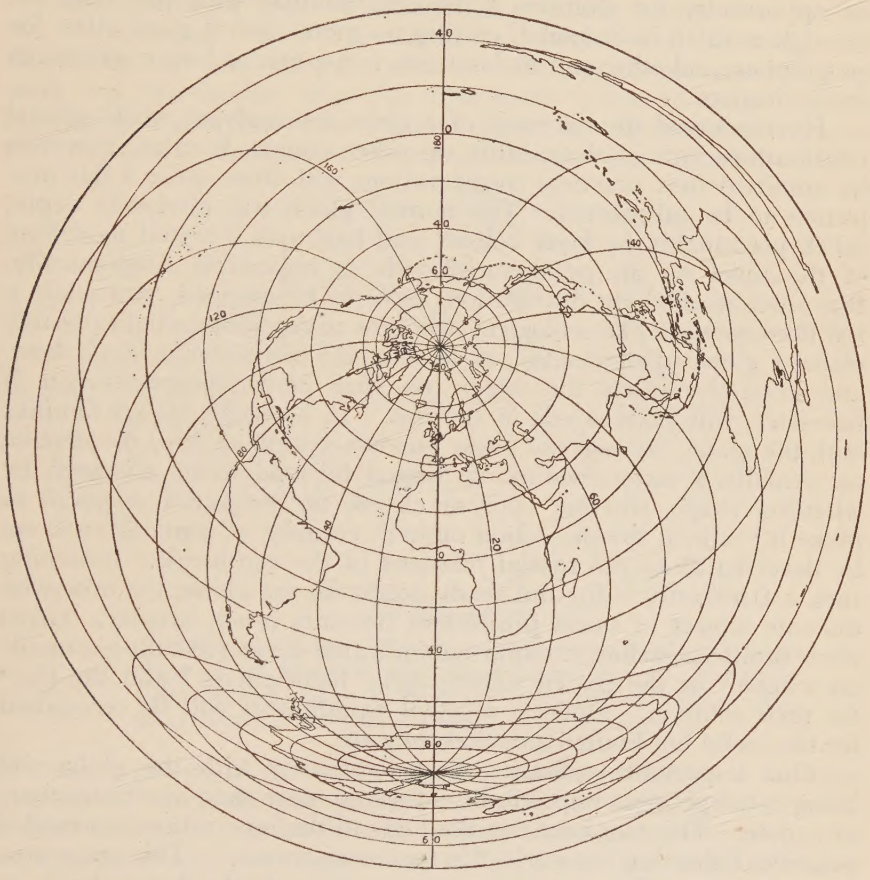

Fig. 1. Oblique Zenithal Equidistant. Bearings and distance correct radially from London.

from any point on the globe. A simpler and cruder mounting aiming at a similar freedom and even including provision for measuring area was put on the market in Austria a few years before the war,[5] but the writer has seen only one model of the kind in this country, and that appeared to aim rather at decorative effect, and it did not provide the same facilities as the American pattern. With all their elegance, this type of mounting is of course only a development of the original mounting whereby the globe moved within a graduated equator and meridian, a much more useful and rational mounting than that so

frequently seen in classrooms, where the sphere rotates on an axis $23\frac{1}{2}°$ from the vertical, permanently condemning the southern hemisphere to obscurity and fostering the harmful widespread identification of " top " with " north."

So long as currency difficulties prevent the importation of these new globes, there seems to be a great field for commercial enterprise in this country in producing a range of globes beginning with small, simple patterns for schools, with perhaps no mounting at all—what an opportunity for children to become familiar with the globe !—through a 12-18-inch model, costing no more than a good atlas, for geographers and other cultured citizens, to 3-4-foot or larger specimens for institutions.

Having urged the necessity of a globe for studying world spatial relationships and its desirability on other counts, it must, however, be admitted that practical considerations will often cause a flat projection to be substituted. The normal globe will obviously depict relief, presumably by layer colours and hachures if actual modelling of the relief on an exaggerated scale is impossible economically. But other world-wide distributions have to be mapped, and while a few fundamentals like geological structure or vegetation might possibly claim a globe to themselves, at least at the institutional level, these, and certainly others for which no such perfect representation is necessary, will have to rest in the flat. If, however, we are familiar with the globe, we will not allow our conception of, say, the Pacific as virtually a water hemisphere ringed by land to be obscured by whatever shape, whether open or closed, the projection happens to make it ; nor, if the projection omits it entirely, as some do, will we be deceived as to the spatial relations of the continents. Assuming then a familiarity with, and ready access to, the globe, the otherwise difficult subject of world projections becomes much simpler. Great circle problems no longer require complicated devices like the gnomonic on a cube [6] or the geared stereographic hemispheres [7] and the like [8] for their solution. Oblique zenithal equidistants will be recognised for the useful but limited aids that they are.

One important realisation that familiarity with the globe will bring is the physical impossibility of seeing more than one hemisphere at a time. This fact confirms the logic of the now rather out-moded practice of showing the world " in two hemispheres." This usage was, however, generally marred by a restriction of the hemispheres to " Old World and New World " or " Northern Hemisphere and Southern Hemisphere " with only an occasional move in the right direction with " Land Hemisphere " and " Water Hemisphere." Schrader [9] with his orthographic hemispheres featuring each of the continents and major oceans in turn is a notable exception. We ridicule the proverbial rustic who objected to the reverse of his photograph being blank and demanded that it show his rear view, but solemnly devise projections that purport to show all of a sphere at once and seriously compare and contrast their merits instead of roundly condemning them all *as representations of the sphere.* We must, of course, accept many of them as convenient assemblages on one

sheet of the various parts of the world, all systematically distorted. Since it is quite useless to attempt to read anything of space-relations from such maps, we may as well cut out the space—normally the oceans—we are least interested in, for by so doing we can diminish the distortion of the space—normally the continents—we are most interested in and so use our page more economically—that is, obtain a larger scale for a given area of paper than if we retained space for the unwanted areas. Conversely, continents can be cut when oceans are our special interest. The beginnings of this process are seen in the " interrupted " and " recentred " sinusoidals and Mollweides of Bartholomew [10] and others : polar as well as equatorial cases can be used, but the former gives the " butterfly " type of map [11] which spreads itself over the paper without filling it, whereas the latter uses the available space to much better advantage. For certain purposes,

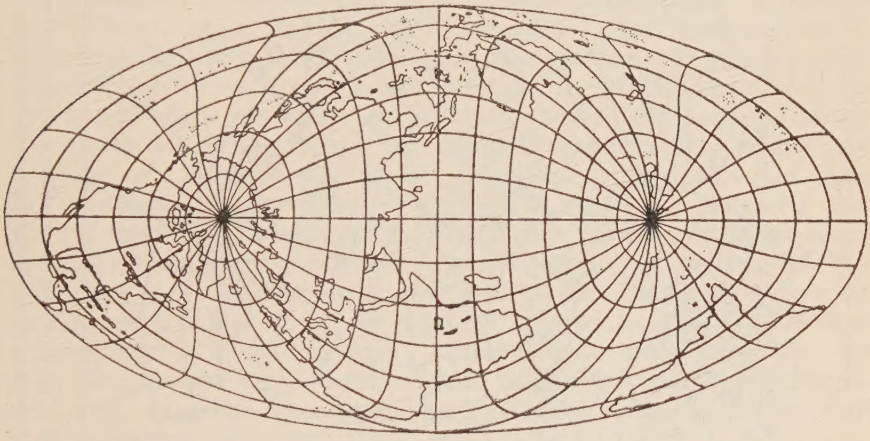

Fig. 2. Transverse Mollweide. Central meridian chosen to allow optimum shape for the British Empire. Reproduction based on Sir Charles Close, Ordnance Survey Professional Papers, New Series, No. 11, 1927, by permission of the Director General, Ordnance Survey.

of course, the polar case may nevertheless be preferable. In these interrupted cases, the projection is cut down the centres of the oceans so that each continent has its own central meridian and the projection repeats its better parts instead of running into its wildly distorted periphery. Refusal to cut and insistence on mathematical perfection have brought the selected parts of the continents into the less distorted parts of the graticule by elegant but fantastic devices like that of the transverse [12] and oblique [13] Mollweide or oblique Mercator.[14] It must be added that the latter has certain virtues as a Mercator if not as a world map. However, not only may we normally slit these projections, but, as stated above, we may cut out parts that do not interest us. Since we know the Atlantic is grossly ill-shaped on our projection, we can profitably discard it and bring Brazil as close as may be to Africa. Similarly, Australia can be moved to the westward. The extent of the displacement may conveniently be indicated by repeating Greenland and Northern Australia. Thus not only do we achieve

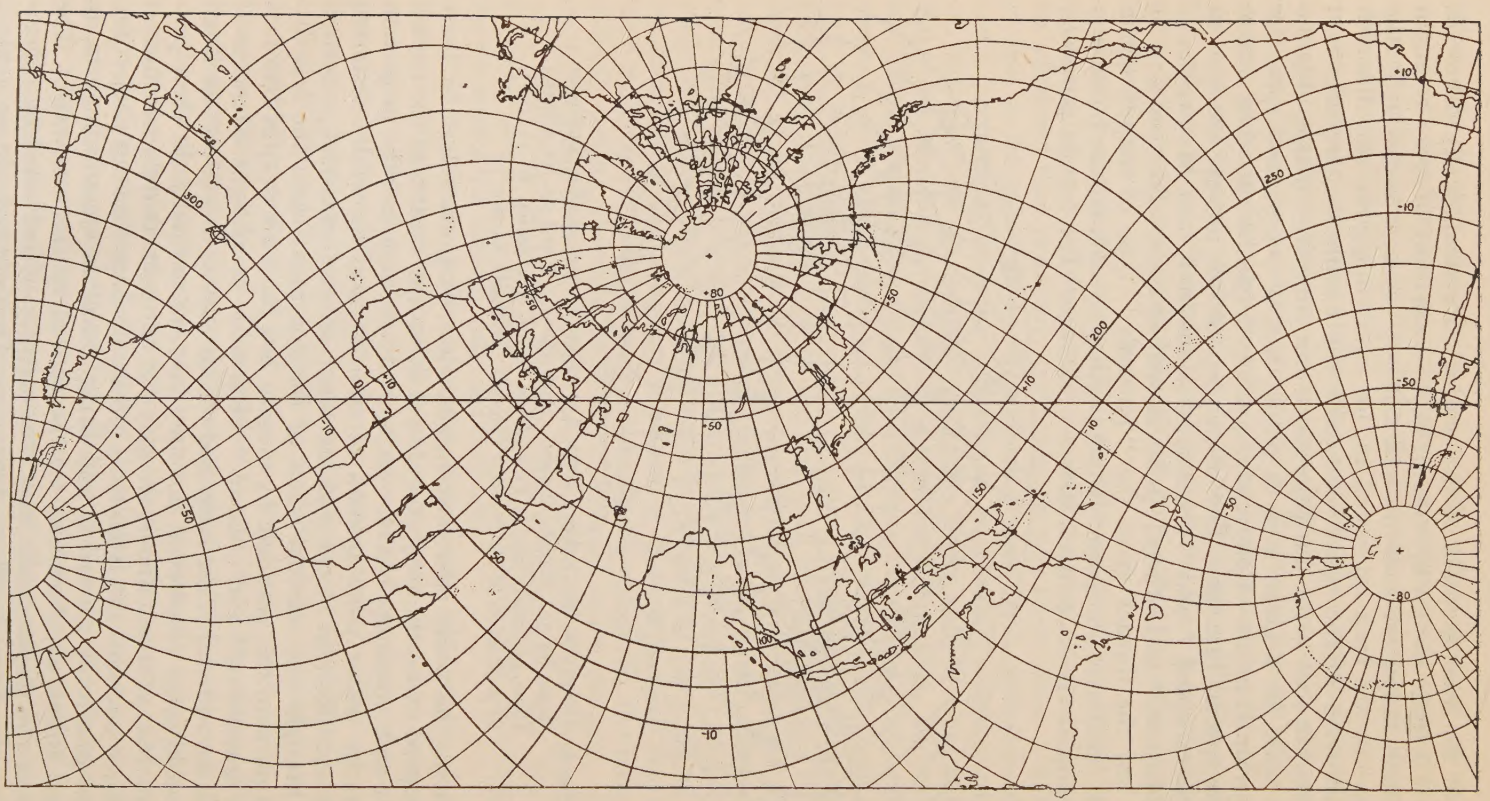

Fig. 3. Oblique Mercator, Pole 35½° N, 270° E. No. 2 of a set of six oblique cases calculated by A. R. Hinks, C.B.E., F.R.S.
Reproduced by courtesy of the Royal Geographical Society.

the advantages mentioned above, but we remove the danger of deluding ourselves into regarding our map as a representation of the earth as a sphere. The one desirable limitation to our cutting and re-arranging of the continents is that we maintain the disconnected portions of a parallel in line—that is, while we move America and Australia inwards towards the Old World, they are better not displaced to either north or south. Any other arrangement would be too confusing for the many distributions in which latitude is important, for example climate, vegetation and the like. If we wish, we need not even use the same projection throughout: Goode's Homolosine [15] uses the sinusoidal between 40° N and S and Mollweide in higher latitudes. This is an equatorial case: he also has a polar case, Goode's Polar Equal Area [16] of "butterfly" type and most original with its seven different central meridians, involving quite marked breaks of curvature in the meridians. Bartholomew [13] uses an equally ingenious "composite" projection in his latest atlas. Finch and Trewartha [17] interrupt and dissect Aitoff's projection while Bartholomew does the same for the sinusoidal. Goode's projection has been so treated by the University of Chicago Press, and there are other examples. A somewhat similar arrangement is in use in the Edinburgh University Geography Department. In Fig. 4 a simple equal-area projection (Mollweide) has been slit, unwanted parts discarded and each land-mass given its own central meridian. Mathematical elegance is disregarded in favour of economy [18] and convenience. Its use, of course, must be limited to distributions: no claim is made that it is a general-purpose map: for spatial relationships the globe must be referred to. Closely allied to relationships is communications, whether it be early migrations by land bridges, ocean voyages, aircraft flights or rocket trajectories. All such considerations must be referred to the globe for full comprehension.

If such reference to a globe is forced by circumstances to be a counsel of perfection—it may, for example, be vital to a writer's purpose to have a map illustration—then certain projections, used with a knowledge of their limitations, must be resorted to. The value of equidistant zenithals has already been mentioned: for purposes of general relationships—that is, those for which only the globe is satisfactory—the much-neglected orthographic might well be used more, especially in view of recent technical advances, referred to below. Being a zenithal, it shows correct direction from the centre, but scale is correct only along the circumference. It represents only one hemisphere at a time. From the point of view of the conventional textbook, therefore, its "properties" are poor. On the other hand it has the great virtue of offering a perspective view of the globe—it is in effect the projection which would be obtained by a photograph of the globe from infinity. Distances cannot be measured by a ruler on a photograph of a street accident, but our perspective sense nevertheless enables us to make a very shrewd estimate of the spatial relationships of the elements involved. Why not, then, a projection of the world, in hemispheres, on which a ruler frankly cannot be used, and rely on the viewers' powers of perspective sight? The stimulating maps in R. E.

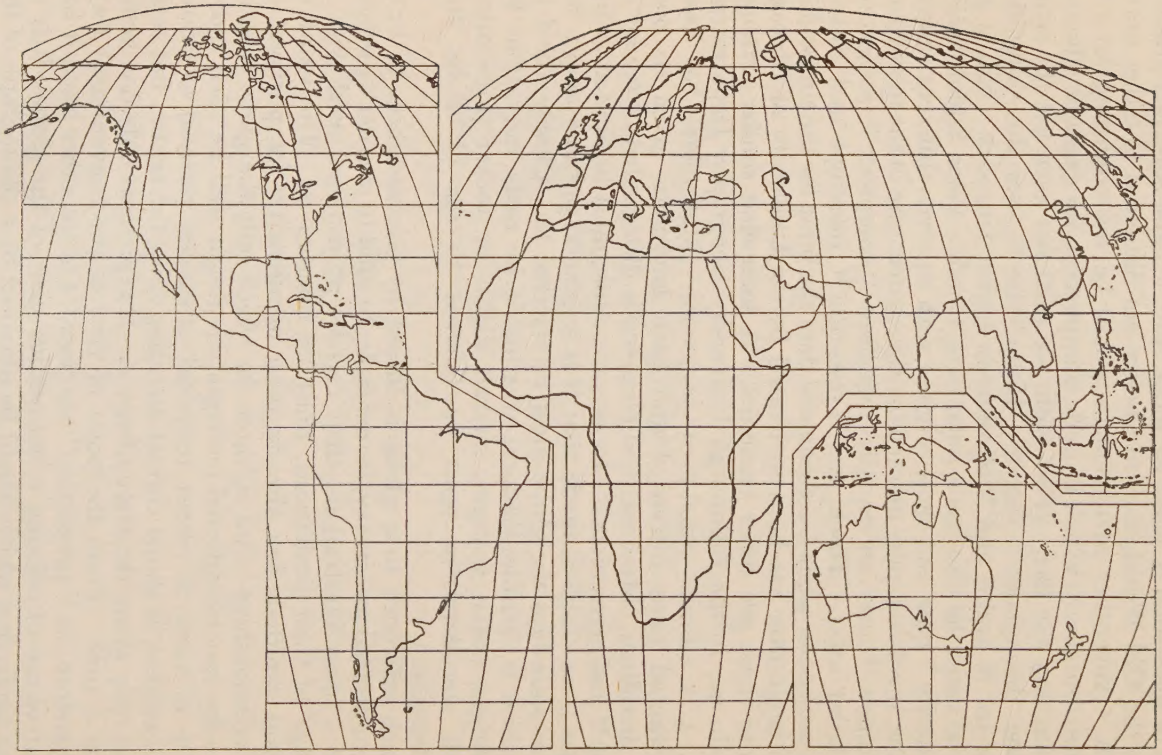

Fig. 4. Mollweide, recentred for each continent, oceans excised, and Australasia displaced to the west. Devised and drawn by Dr. Ronald Miller, and used for distribution maps in the Geography Department of the University of Edinburgh.

Harrison's " Atlas," [19] while perhaps over-popularised and somewhat exaggerated in style sometimes, show what can be done along these lines. The method apparently involves photography but relies considerably on free-hand drawing for not only the relief but the perspective. Now that we have the very long-focus camera as developed for aircraft and the excellent paper prints from colour-photography—in the U.S.A. at least—there would seem to be no reason why near-orthographic " maps " should not be produced by a combination of these techniques from good relief globes. A simple change of position of the globe with respect to the camera would supersede the laborious computation of a projection for yet another centre, and, within limits, obliques, in the sense of not directing the camera at the earth's centre but somewhere between that and a tangent, could also be made. The insertion of place-names is an obvious difficulty, but a practical one, yielding to good draughtsmanship. Even if the photographs are used only as a base for drawings, it is, however, most desirable that the shading inherent in the modelling of the sphere be retained, as is done by Harrison [19] and Schrader,[9] to enhance the impression of viewing a solid globe and so aiding our faculty for estimating spatial relationships from a picture with perfect perspective.

No discussion of world projections is, of course, complete without a warning against the misuse of Mercator's projection. In this case, however, having urged a return to the use of the globe, it is necessary to point out that Mercator is the one projection that offers a facility not found on the globe—that of showing a constant bearing as a straight line. However, as this is a property seldom required by geographers, our main interest in Mercator should be in the transverse case as used by the Ordnance Survey in conjunction with the new National Grid.

In conclusion, the writer wishes to make it quite clear that the valuable aid given by mathematicians to geographers is by no means disparaged. The fault, where it exists, is mainly with ourselves in sometimes becoming overwhelmed by the embarrassment of riches offered. Our occasional entanglements with elaborate projections to the neglect of the simple have, it is to be feared, sometimes been akin to the babu's difficulties with unusual long words where simple English would have served. On the other hand, mathematicians are not guiltless of assuming that because a projection is elegant from their point of view it must therefore be valuable to the geographer. Mr. Baar, a practising architect, will, it is hoped, not take it amiss if, while acknowledging the great interest and value of his article [5] referred to, one of the concluding sentences is cited as an example of a distinct *non sequitur* of the type meant : " Such is the flexibility of the general equation that it appears capable of embracing projections which, in their varied efficiency and elegance, can meet most cartographical requirements." With respect it is submitted that the flexibility of the general equation from which it is derived has no bearing on the extent to which the resulting projection, however elegant, will suit the cartographer's requirements : only the cartographer can decide that. Before he can decide, however—and perhaps this is the crux of the matter—the geographer, for we are all cartographers be it at the

producing or consuming end, must make himself sufficiently familiar with the geometry of the sphere and the properties of the projection offered to be capable of judging for himself.

Summary

A plea for a fresh approach to the problem of the representation of the entire sphere ; for a return to the use of the model globe where only this can serve the purpose ; for the use of a simpler graticule when sphericity is not involved and for willingness to explore the possibilities of modern methods of representation of the globe for occasions where the model, though desirable, is not practicable.

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[1] B.O.A.C. map. London : Edward Stanford Ltd.

[2] Admiralty Chart, 5085. 1946.

[3] There is even a projection on to six squares and eight equilateral triangles designed to be mounted into a solid flat-faced "globe": FULLER, R. BUCKMINSTER. Copyright, 1943. *Life.* Not to mention the twenty-faced icosahedron : FISHER's "Likaglobe" (U.S.A.).

All families of curves—and some hybrids—are being pressed into service. Baar even shows us how an *unlimited* number of projections can be obtained in a certain class. BAAR, E. J. The Manipulation of Projections for World Maps. *Geographical Review*, 1947.

[4] RAND MCNALLY, for example.

[5] HAART, ROBERT. Vienna.

[6] Among others, HINKS, "Map Projections," gives an account.

[7] DILLOWAY, A. J. Cartographic Solution of Great Circle Problems. *Journal of the Royal Aeronautical Society*, 1942, 46.

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[15] GOODE. School Atlas.

[16] GOODE. Copyright, 1928.

[17] FINCH, V. C., and TREWARTHA, G. T. Elements of Geography. New York : McGraw-Hill Book Co. Inc. 2nd ed., 1942.

[18] A simple Mollweide, *i.e.* an ellipse with major axis twice the minor, would require 70 per cent. more paper to show the continents on the same scale.

[19] HARRISON, R. E. Look at the World. New York, 1944.

THE RAILWAY GEOGRAPHY OF BRITISH MALAYA

By C. A. Fisher

Introduction—the Local Setting

In comparison with the neighbouring lands of South-east Asia, Malaya has a somewhat elaborate railway system. Indeed, no other nearby territory has so great a length of line relative to its population, and only in Java is the ratio of total area to railway mileage lower (see Table I). This fortunate state of affairs must be attributed primarily to the great mineral wealth of Malaya, the extraction and removal of tin together providing both the original *raison d'être* of the railways and, by means of export duties levied by the state governments, the funds wherewith to pay for them.

Otherwise, with few exceptions, Malayan conditions are no more favourable to railway construction than those pertaining elsewhere in South-east Asia. Loco coal—of a very poor quality—is obtained at Batu Arang in Selangor in sufficient quantity to supply the whole system, and in this respect Malaya has a distinct advantage over its nearest neighbour, Siam, which relied exclusively on wood fuel until the recent introduction of diesel-electric locomotives. Ballast, likewise, comes from railway-owned workings, including a granite quarry at Segamat (Johore), and limestone quarries at Ipoh (Perak), Kodiang (Kedah), and Kuala Lipis (Pahang), while from indigenous hardwoods, notably merbau and chengal, are made sleepers capable of resisting the attacks of white ants for some ten to fourteen years. Similar woods are also used for coach building at the workshops near Kuala Lumpur, though all the metal frames, as well, of course, as the locomotives and rails, are imported, mainly from Great Britain.

The effect of the equatorial climate, with its persistent heat and excessive rainfall, on maintenance is nowadays less serious than might be expected. Thanks to an efficient Public Works Department and the painstaking activities of the Drainage and Irrigation engineers, railway maintenance costs little more in the highly developed western states than it does in Great Britain. The same, however, is not true of the so-called East Coast line which, from Kuala Lipis to northern Kelantan, passes through almost uninhabited and completely untamed jungle. Along this section periodic floods are apt to wreak great havoc to bridges, embankments, and cuttings. Thus in December 1926, the worst rainy season recorded in eastern Malaya, the track was flooded to depths of over 20 feet in many places, and at Manek Urai two steel spans in the bridge over the Sungei Lebir, each 250 feet long and weighing 807 tons, were washed away. Although serious floods are by no means confined to the eastern side of the country,[1] it is broadly true that the principal difficulties of railway construction have been overcome in the west, whereas such is not the case in the east. In the latter, to quote an official report, " the problem is not so much to build a bridge, as to keep it in place when it has been built."

So far as relief is concerned, Malaya as a whole is by no means an easy country for railway construction. Scrivenor [2] has well described the salient features: the series of N-S granitic ridges separated by equally well-marked and often constricted valleys, and the dominant character of the Main Range, the great divide between east and west, which extends north from the Negri Sembilan to the Siamese frontier. In the relatively low-lying undulating country

Fig. 1. Malaya: Railways.

between the Straits of Malacca and the Main Range—in which belt are concentrated the bulk of the alluvial tin deposits—it has proved possible to adopt a ruling grade of 1 in 100, except for "the Pass," a short stretch of 1 in 80 between Taiping and Padang Rengas. Again, in this important western strip the superficial deposits most frequently encountered are easily worked laterites which have caused little difficulty to the engineers. The East Coast line, on the other hand, traverses some very rugged granitic plateau country in northern Pahang and Kelantan, involving lengthy and expensive tunnelling,

and the construction of numerous large bridges. Nevertheless it has proved possible here also to avoid gradients stiffer than 1 in 100, but hitherto all projects to link the eastern and western lines north of Gemas have been abandoned owing to the excessive steepness of the surveyed routes across the Main Range.

Historical Geography

Three main stages can be distinguished in the growth of the Malayan railway network, each of them intimately associated with an important change in the political geography of the peninsula.

The first of these corresponds to the period which saw the establishment of British protectorates over the three leading tin-producing states, Perak, Selangor, and Negri Sembilan on the western side, and also over Pahang which was mistakenly believed to be correspondingly rich in gold. Prior to this advance into the interior, which began in 1874, British interest in Malaya had been confined to coastal trading carried on from three main points, Singapore, Malacca, and Penang, strung out along the shores of the Straits of Malacca.

As their collective name, the Straits Settlements, implied these were conceived of in maritime terms and were held together by sea communications. The extension of British control to the interior, however, necessitated the development of land routes, but the old sea-state concepts died very slowly. Economically, the protectorates were in many ways the offspring of the S.S. From the latter came much of the capital and enterprise which went into the early development of the former, and politically also the colony [3] originally held the leading strings.

This situation expressed itself geographically in the early communication system which evolved in response to it. Four railway lines were built during this initial phase, each of them linking an inland tin-producing region with a coastal port, whence the ore was shipped to either Singapore or Penang for smelting. First, in 1885, came the Port Weld-Taiping railway, eight miles long, built to serve Larut, at that time the leading mining area. It was followed in 1888 by a more ambitious line in Selangor from Klang to Kuala Lumpur, 22 miles away, and already a rapidly growing mining centre, and in 1891 by the Sungei Ujong Railway from Port Dickson to Seremban, likewise important for tin. Meanwhile to the north, in Perak, the Kinta valley had displaced Larut as the principal mining district, and in 1893 was opened the first section of the Kinta Valley Railway from Teluk Anson to Tapah Road, whence it was extended two years later to Ipoh and Batu Gajah.

Thus, in the space of a decade, was established the basic communications pattern of Malaya, consisting of a series of short overland routes to the Straits ports, there linking up with the older coastal shipping lines to Singapore and Penang. Certain details of the history of these early lines deserve at least passing mention. For example, the Port Weld-Taiping line was built by Ceylon Government engineers, before being handed over to the Perak Government, and

from that time forward Ceylon Tamils have constituted a major element among the polyglot staff employed by the Malayan railways (see Table II). The Selangor Railway, on the other hand, was constructed by the Selangor Government, the necessary money being lent in the first instance by the S.S. Government, while the Sungei Ujong Railway long remained the only line in Malaya built and operated by a private company.

The creation in 1896 of the Federated Malay States marks the beginning of the second phase in Malayan railway development during which connection was made between all the four original lines and the system further extended in various directions. Not least among the

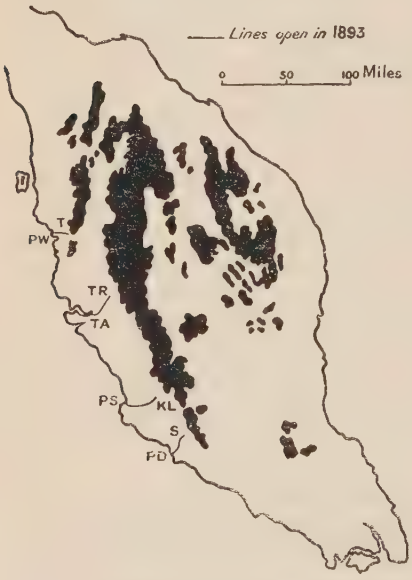

Fig. 2. Railway Lines in Malaya, 1893.

Fig. 3. Railway Lines in Malaya, 1900.

Land over 1500 ft. in black. P=Prai. PW=Port Weld. T=Taiping. E=Engor. TR=Tapah Road. TA=Teluk Anson. KK=Kuala Kubu. KL=Kuala Lumpur. P=Pudu. PS=Port Swettenham. S=Seremban. PD=Port Dickson.

causes leading to federation was the need for co-ordinating railway construction and practice in the states concerned. Moreover, the peculiar mixture of prestige and independence from Colonial Office control, which the F.M.S. rapidly came to enjoy as a result of its federated and yet merely protected status respectively, was reflected, *inter alia*, in the highly independent and exceedingly efficient policy, based on the maxim of local solutions for local problems, followed by its railway department.

All the lines were built on the metre gauge, as is common practice in British colonial lands. But for a number of years, both before and after federation, a considerable difference of opinion existed in respect of locomotive policy between Perak and Selangor, the former favouring concentration on a single type of all-purposes engine,

while the latter preferred to use different types for passenger and freight traffic. Eventually, in 1899, the former view prevailed, and after the amalgamation in 1901 of the Perak and Selangor State Railways, thenceforward known as the F.M.S. Railways,[4] was generally adopted. Between 1904 and 1906 the new F.M.S.R. central workshops were established at Sentul near Kuala Lumpur on a short branch line which was continued as far as the Batu Caves quarries.

The main railway construction of this period, however, was the N-S trunk line through the three western states. Already, before the turn of the century, the N-S grain of the country was beginning to stamp itself into the communication pattern. Although the earliest railways showed a generally E-W direction, any extension into the interior, such as that of the Kinta Valley Railway to Ipoh and then to Enggor (1898), or the Ulu Selangor line to Kuala Kubu (1894), inevitably came to assume a longitudinal trend in following the major valleys. Thus, almost insensibly, the separate lines reached out towards each other, and the construction of a trunk line merely involved filling in the remaining gaps. The curious zigzag direction of the main line to-day results from this process.

Progress towards its completion came swiftly. By 1903 through running was possible from Port Dickson, via Seremban, to Prai in Province Wellesley, immediately opposite Penang, and three years later the main line had been extended south from Seremban to Tampin, and a branch built from the latter to Malacca. Both the Prai and the Malacca sections of necessity ran through S.S. territory, but by this time a complete reversal in the relative importance of S.S. and F.M.S. had taken place, and these lines were built by the F.M.S.R. for the S.S., the cost being advanced as a loan by the former.

As a result of these various developments the communication systems of the three western states, together with those of Malacca and Province Wellesley, became integrated for the first time. But the traveller from Singapore was still compelled to take ship at least as far as Malacca on his journey to Kuala Lumpur or Penang.

Even more anomalous, in the eyes of contemporary F.M.S. officials, was the failure to establish railway connection with the fourth state of the federation, Pahang. From its very inception the F.M.S. appears to have evoked a curious form of parochial patriotism among the European population, which early expressed itself in the demand for "an F.M.S. port comparable to Singapore or Penang." The result of this was the creation of Port Swettenham at Kuala Klang, to which the Kuala Lumpur-Klang line was extended in 1899, although it seems that the mouth of the Sungei Dua, suggested in 1891 by the Resident Engineer of the Selangor State Railways, would have provided a better harbour.

Also in 1891 this same engineer made two journeys into Pahang in search of a suitable railway route thither from Kuala Lumpur, and eventually reported in favour of one via Ginting Peras to Temerloh, despite a difficult descent on the eastern side of the Main Range. Meanwhile the Sungei Ujong Railway Company was thinking in similar terms, and tentatively surveyed a route from Seremban to

Temerloh before deciding that the cost of construction would be prohibitive. Later the F.M.S. authorities reawakened interest in these earlier projects, and in 1895 planned to extend the line already built from Kuala Lumpur to Sungei Besi across the Main Range via Ginting Peras at a summit level of 1500 feet to Pahang. But again the N-S grain of the country asserted itself; the proposed route proved to be impracticable and the line which had begun as the route to the east was continued instead as part of the trunk line to the south. Other possible routes linking Pahang with the western states were subsequently explored, including one from Kampar and Batu Gajah in Perak to Kuala Lipis, via Cameron Highlands—where an important hill station is situated—but have in the end been vetoed by topography.

Thus gradually it became clear that the F.M.S. was a singularly difficult territorial unit to integrate by means of the railway. The largest of its four component states seemed destined to remain, as Hugh Clifford, its first sponsor, expressed it, at " the farther side of silence," while Singapore, much the largest city of Malaya, was separated from the federation by the negative jungle spaces of Johore. The sporadic occurrence of mineral deposits, however valuable they may be commercially, is an unsatisfactory basis on which to establish a political unit, and a little more attention to the facts of geography on the part of the founders of the F.M.S. would probably have led them to pursue a different policy. But once this truth had become apparent, it was a matter of only a few years before the British sphere in Malaya was extended to what may reasonably be called its logical conclusion.

The phenomenal rise, during the first two decades of the twentieth century, in the importance of rubber in the Malayan export economy was the primary factor emphasising the geographical unity of the peninsula for, as an agricultural and not a mineral commodity, its production was not limited to a few relatively small areas. Since so many of the more accessible regions in the western F.M.S. were already the scene of mining activity, which restricted the amount of land available, or ruined its fertility with " tin tailings," the desire was soon felt for freer scope in the adjacent territories hitherto unaffected thereby. While undoubtedly vast tracts of Pahang were intrinsically fairly suitable for rubber planting, their remoteness rendered them less attractive than Johore or Kedah, and even Kelantan was preferred by the Duff Development Company, which started operations there in 1901.

In all these new areas, however, extensive economic development depended on the building of railways, so that plans for such construction which had been mooted in the closing years of the nineteenth century were rapidly put into practice. As early as 1899 the possibility of linking the F.M.S. railway system with those of Burma, via Victoria Point, and Siam had been discussed in British circles, but it was not until 1907, when the Foreign Office realised that German engineers in Siamese Government service had already cut a track for a standard gauge railway from Bangkok to Kelantan, that any effective action was taken. As a result of the British-Siamese negotiations which followed,

PADANG BESAR RAILWAY STATION: NAME IN ENGLISH, CHINESE, BURMESE, MALAY, TAMIL, AND SIAMESE

PENANG HILL FUNICULAR RAILWAY

KUALA LUMPUR RAILWAY STATION

SINGAPORE RAILWAY STATION

the German project was forestalled, and the four Siamese provinces of Kelantan, Trengganu, Kedah, and Perlis came under British protection in 1909. In return the British abolished consular jurisdiction in Siam, and granted a loan, supplied by the F.M.S. government, for constructing a metre gauge railway from Bangkok to the Kelantan and Kedah frontiers.

Meanwhile, in Johore, somewhat similar developments were taking place. Between 1904 and 1909 the F.M.S.R. financed and constructed the Johore State Railway linking the F.M.S. trunk line,

Fig. 4. Railway Lines in Malaya, 1910.

Fig. 5. Railway Lines in Malaya, 1939.

Land over 1500 ft. in black. HJ=Haadyai Junction. PB=Padang Besar. AS=Alor Star. TU=Tumpat. SG=Sungei Golok. PM=Pasir Mas. P=Prai. PW=Port Weld. I=Ipoh. Tr=Tronoh. TR=Tapah Road. TA=Teluk Anson. KLi=Kuala Lipis. KK=Kuala Kubu. B=Batu Caves. BB=Batang Berjuntai. KS=Kuala Selangor. KL=Kuala Lumpur. PS=Port Swettenham. A=Ampang. S=Seremban. KP=Kuala Pilah. PD=Port Dickson. Ta=Tampin. M=Malacca. G=Gemas. JB=Johore Bharu. Si=Singapore.

already extended south to Gemas, with Johore Bharu, the state capital situated immediately opposite Kranji. The last, in turn, was the terminus of the short S.S. Government railway traversing Singapore island from south to north.[5]

The Johore State Railway was thereafter leased and operated by the F.M.S.R. and fulfilled the dual function of opening up the great rubber growing belt of west-central Johore, and completing the rail connection—apart from the ferry across the Johore Straits, which was replaced by a causeway in 1923—between Singapore and the F.M.S. The closing of this major gap in the rail communication of Malaya in 1909 was followed, hardly accidentally, by the extension of British

political influence into Johore, for in 1914 a General Adviser was appointed to that state, with duties which differed but little from those of the Residents in the federated states.

The period 1909-1914, therefore, marks the rounding off of the British political sphere in the Malay peninsula by the establishment of protectorates over the four northern unfederated states, and the bringing into line of Johore in the south. It may equally well be regarded as inaugurating the third phase in the growth of the Malayan railway system, during which the latter also reached its maximum expansion. By means of the Johore State Railway and the new Kedah Railway, built between 1912 and 1918, through running between Singapore and Bangkok became a reality. In addition, two short lines were built in Selangor, one from Klang to Kuala Selangor in 1914, and the other reaching the Malayan Collieries at Batu Arang in 1915, later to be extended thence to Batang Berjuntai in 1918.

Much the most spectacular achievement of this period, however, was the completion of the East Coast railway, which runs from Gemas to Kelantan, and took some twenty-four years to build. Work started from Gemas in 1907, and from Tumpat in 1912, and since connection was made between the latter point and the Siamese State Railways at Sungei Golok in 1920, Kelantan became linked with Malaya by rail via Siam [6] more than a decade before the line from the south was completed. This, and the equally significant fact that Trengganu is still unreached by the F.M.S.R. system, suggest that these two north-easterly states are oriented, geographically speaking, at least as much towards Siam as to the rest of Malaya, a spatial relationship which has varied little throughout historic times.

Economic Geography

The Malayan railway network at its greatest extent is illustrated in Fig. 5. It is clear that, alone among the towns of Malaya, Kuala Lumpur constitutes a railway nodal point, and its immediate vicinity is the only area in which even a rudimentary suburban railway net exists. A more striking feature of the pattern shown in Fig. 5, compared with Fig. 2, is the way in which the N-S grain of the country has overridden the earlier tendency towards E-W integration. Thus, despite its apparent nodality, Kuala Lumpur has not become the junction of an E-W line from Port Swettenham to Kuala Lipis and Kuantan with the N-S trunk line passing through the western states, and hence in direct contact with all the state capitals, as was envisaged from the earliest days of federation. And it must be admitted that the relief map not only gives a fully satisfactory explanation of this failure, but further suggests Singapore and not Kuala Lumpur as the obvious focal point for Malaya by rail, as it has long been by sea.

Yet, such has been the force of the local patriotism among the European community in the F.M.S. that neither the insistence on developing Port Swettenham as the Federation's own special port nor the plan for an E-W railway was ever dropped. Thus as lately as 1931 a fresh survey was made for a railway from Kuala Lumpur to Kuantan, using the old Ginting Peras route, which was found to be

feasible "though steep grades, sharp curves and much tunnelling would be necessary." What possible justification there could be for such a line, at least so far as the expensive mountain section is concerned, is difficult to envisage, though the desirability of a branch from the East Coast line to Kuantan is another matter.

The relative economic importance of the various lines, as measured by the volume of traffic they carry, shows several noteworthy features.[7] Fig. 6 shows the density of passenger and mixed traffic carried by the F.M.S.R. in 1939, and emphasises the importance of Kuala Lumpur, and, to a lesser extent, Ipoh, the two main foci of population and

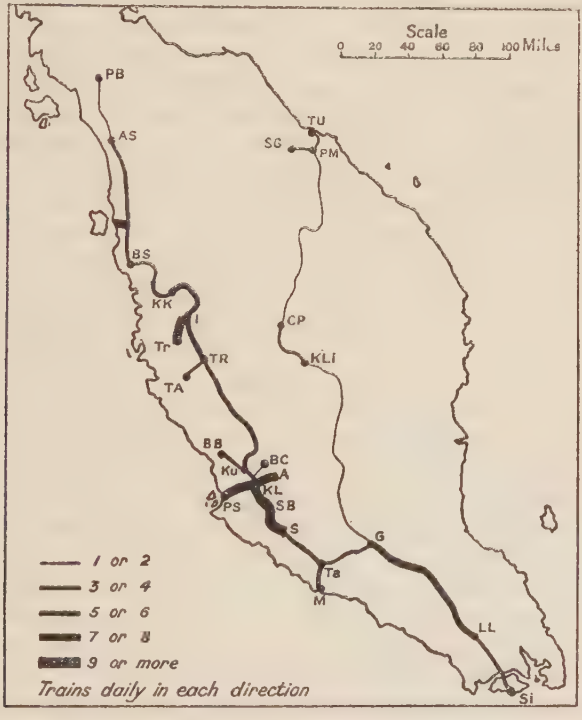

Fig. 6. Railways in Malaya. Traffic density, 1939.

economic activity within the federation.[8] In addition to a number of fast trains between the larger intermediate centres, two expresses ran daily in each direction between Penang (Prai) and Singapore, and similar trains covered the 713 miles from Prai to Bangkok in twenty-seven hours twice weekly. The East Coast line carried much less traffic, for the most part limited to two mixed stopping trains daily, through expresses between Gemas and Tumpat running on only two days in the week.

Freight traffic presents a somewhat different picture in several respects, though the fundamental contrast between the eastern and western lines remains unimpaired. North of Kuala Lipis the East Coast line never paid its way and the initial hopes that it would create traffic were scarcely fulfilled, few estates having been set up along its

route. Indeed a high proportion of such economic development as has taken place in the eastern two-thirds of Malaya is found much nearer the coast, to which access is provided by short roads, or in the cases of the various iron mines opened up by the Japanese, by light railways, whose alignment recalls that of the pioneer lines in the west a generation or more previously.

Besides its greater volume, the pattern of freight circulation in the western strip of Malaya is more complex than that in the east. Table III lists the main items, by bulk, of the goods traffic carried by the F.M.S.R. system as a whole, and these may be broadly divided into two groups so far as the direction of movement is concerned. The first category includes foodstuffs, such as the cattle, ginger, onions, and especially rice, entering the country overland from Siam, and the rice and other surpluses of Kedah, much of which was regularly taken by rail as far south as Kuala Lumpur and sometimes even beyond. These commodities, together with large quantities of general merchandise, and coal from Batu Arang, tended therefore to move, like the greater part of the passenger traffic, along N-S lines. By contrast, the export products, tin, rubber, palm oil, etc., continued, as they had always done, to take the shortest available route to the coastal ports.[9]

In addition to the three largest ports, Singapore, Penang and Port Swettenham, an important subsidiary rôle was played by Port Weld, Lumut, Teluk Anson—which as the outlet for southern Kinta was formerly the largest tin-ore exporter of all—Kuala Selangor, Port Dickson, Malacca, Muar, and Batu Pahat. From the first three shipment overseas was normally direct, apart from the tin sent from Port Swettenham to Singapore for smelting, but the lesser ports were essentially intermediaries between the producing regions and Singapore or Penang. In respect of goods traffic alone the two busiest lines in the country before the recent war were those from Kuala Lumpur to Port Swettenham, carrying the bulk of the Selangor tin and rubber, and from Ipoh to Penang, conveying the north Kinta tin, and plantation produce mainly from Province Wellesley and southern Kedah; imported food and stores travelled in the reverse direction. The only rubber or minerals which moved by rail to Singapore came from south and central Johore.[10]

It can be seen, therefore, that the earliest transportation pattern recognisable in western Malaya by the 1890's, that of short overland routes from the mines to the ports, where connection was made with the Straits shipping lines, has not only been extended, *mutatis mutandis*, to the eastern side of the country, but has remained fundamental in the west despite the superficial appearance of the rail net and the development of new components in the traffic which it carries.

Not all of the smaller ports are served by railways, however, many being exclusively dependent on roads. The hinterlands of the larger ports also are well supplied with roads, and from 1930 onwards, when the effects of the world economic crisis began to be felt in Malaya, road/rail competition became a serious problem, for the transportation pattern, with its emphasis on short hauls and numerous coastal ports, favoured the lorry as opposed to the railway. The road transport

companies, moreover, could collect rubber direct from the estates and, being private—mostly Chinese—firms, could work their employees more ruthlessly than the railways which were a Government concern. Above all, in the absence of any fixed and published scale of charges, the road haulage undertakings could and did quote special competitive rates as they pleased, and were at liberty to reject any traffic which they did not wish to convey, such as coal, on account of its dirtiness, or tapioca refuse, whose acid content burned the lorry floors.

Between 1929 and 1933 railway receipts fell by 61 per cent. and the financial position of the F.M.S.R. became exceedingly critical. Accordingly the Road Transport Board was set up to co-ordinate road and rail services, and to seek means of avoiding wasteful competition between the two. As a result of introducing strict control over the road transport companies and granting greater freedom to the railway in quoting special rates to customers, the Board eventually succeeded in stabilising the situation to some extent. Strictly speaking, road competition was only one aspect of the crisis affecting the F.M.S.R. at this time for, since the whole F.M.S. economy was based on primary production, distress was widespread. But, unlike the other features of the crisis, it had come to stay.

It is ironic that the completion of the East Coast line in 1931, which marked the long-awaited maturing of the Malayan railway network, should have coincided with the period when world conditions were to precipitate a sudden change from expansion to retrenchment throughout the country. In the years immediately following, the labour staff of the F.M.S.R. was reduced from 25,000 to under 12,000 (Table II), and various lesser lines, which could no longer justify their existence in the teeth of road competition, went out of operation.[11] Thus the system which in 1931 had reached its greatest extent was shortened during the next few years by the closing of the Kuala Pilah and Kuala Selangor branches, while passenger traffic ceased on both the Port Weld and Port Dickson lines.

The Malayan Railways since 1945

The Allied forces which returned to Malay in August 1945 found the railways, in common with other installations, in a state of chaos and disrepair. Besides the very extensive demolitions, particularly of bridges, carried out by British forces during the retreat between December 1941 and February 1942, more serious depredations had resulted from the Japanese occupation itself. Already before the close of 1942 the Japanese embarked on a policy of railway construction in various parts of South-east Asia in an attempt to provide overland alternatives to more vulnerable sea lines of communication, the most striking case being the Siam-Burma railway which was completed in 1943.[12] Since, for the first time in history, the whole of south-east Asia was under a common administration and in view of the shortage of railway materials, numerous strategically less essential lines were abandoned in Malaya, Java, and Burma, and their rails, as well as many locomotives and much rolling stock, removed elsewhere. Thus in Malaya the whole of the track from the Tronoh, Teluk Anson,

Malacca, and Kuang-Batang Berjuntai branches, and from 200 miles of the East Coast line between Mentakab and Krai—some 276 miles in all—disappeared, along with 54 of the 179 locomotives and about half the 5800 goods wagons owned by the F.M.S.R. immediately before the occupation.[13] Totally inadequate maintenance and running repairs and finally widespread Allied bombing, which, *inter alia*, destroyed two-thirds of the main workshops at Sentul, further aggravated the situation.

During the period September 1945 to 31st March 1946, while the railways were under military control, considerable progress was made in the repair of bridges, harbour installations, and the central workshops, and 24 " MacArthur " class locomotives and 215 W.D. bogie wagons were brought into the country. Thereafter civilian administration took over, and by the end of 1946 the Teluk Anson branch had been relaid, and skeleton services introduced on most lines which together proved capable of handling about half of the pre-war volume of freight traffic. Tables III and IV give an indication both of the achievements in this respect and of the abnormalities which still remain, albeit to an ever-diminishing extent.

Hitherto, as this study has shown, each major change in the political geography of Malaya since 1874 has had its counterpart in important modifications to the railway system. To this rule the Japanese interlude is no exception, and indeed it is probable that some of its effects may be permanent, for not all of the removed lines seem likely to be restored. At present the only overland communication between Kelantan and the rest of Malaya is via the Royal Siamese Railways, a reversion to the conditions which prevailed from 1920 to 1931.[14] But apart from the repair work now in hand or projected, all available evidence suggests that the most recent political development in the peninsula, namely, the federation of all Malaya excluding Singapore in 1948, will be marked by no corresponding changes in the railway geography. For in Malaya to-day there appears to be no justification for new railway construction, although considerable scope exists for further elaboration of the road network.

TABLE I

Railways in South East Asia, 1939

Territory	Railway Mileage	Area 1000 Sq. Miles	Population 1,000,000's	Area per Mile of Railway Sq. Miles	Population per Mile of Railway
Malaya . .	1,067	52·3	5·6	49	5,154·6
Java and Madura	3,362	51	47·7	15	11,213·6
Sumatra . .	1,227	182	9·0	148	7,335
Total N.E.I. .	4,589	735·3	69·4	160	15,297·5
French Indo-China	1,817	286	23·7	152	13,043·5
Siam . . .	2,037	200·1	15·6	98	7,658·3
Burma . .	2,060	261·6	16·6	127	8,058·3
Philippines . .	867	115·6	16·3	123	18,800·5

TABLE II

STAFF EMPLOYED BY F.M.S.R., 1935

Europeans	106
Eurasians	135
Malays	1,570
Indians and Ceylonese	8,941
Chinese	868
Others	23
Total	11,643

TABLE III

PRINCIPAL COMMODITIES CARRIED BY F.M.S.R. (Figures in tons)

	1939	1946 (April-December only)
General merchandise	393,675	348,290
Agricultural produce	72,550	20,760
Cement	65,291	39,953
Forest products	37,050	17,425
Palm oil	45,814	6,335
Petroleum products	141,498	70,807
Rice	256,491	69,827
Livestock	7,064	3,617
Tin and tin ore	71,823	12,584
Rubber	206,810	179,425
Coal, coke, and firewood	256,558	89,620
Other minerals, stone, etc.	312,605	6,521
Total	1,867,229	865,164

TABLE IV

DIRECTION OF RAIL-BORNE RUBBER TO MALAYAN PORTS

	1939	1946 (April-December only)
Prai	22·2 per cent.	33·4 per cent.
Port Weld	2·5	—
Teluk Anson wharf	5·2	—
Port Swettenham	41·5	52·2
Port Dickson	5·7	1·0
Malacca	1·4	—
Singapore	21·5	13·4

REFERENCES

[1] Another bridge in Province Wellesley was carried away in the same flood season.

[2] SCRIVENOR, J. B. Geology of Malaya. London, 1931.

[3] *I.e.*, the Straits Settlements.

[4] The Sungei Ujong Railway from Port Dickson to Seremban remained a private concern until taken over by the F.M.S.R. in 1908 after the N-S trunk line had reached Seremban.

[5] In 1912 the F.M.S.R. purchased the Singapore-Kranji railway and absorbed it into its own system.

[6] Via Haadyai Junction (Siam) and Kedah.

[7] Only a very few stretches of line in the vicinity of the larger stations were double track ; the total length in 1939 was 74½ miles.

[8] In 1939 the busiest passenger services in Malaya were : Ipoh-Tronoh (14 trains daily each way) ; Sultan Station (Kuala Lumpur)-Ampang (12 trains) ; Sultan Station-Sungei Besi (11 trains) ; Sultan Station-Pudu (9 trains) ; Kuala Lumpur-Port Swettenham (9 trains).

[9] Many of the bulkier imports follow similar routes in the reverse direction.

[10] Messrs. Dunlop introduced special latex tank wagons on the run from Batu Anam, Johore, to Singapore shortly before the war. Palm oil tank wagons, requiring steam heating, were also in use on the line from N. Johore to Singapore. See also : Dobby, E. H. G. "Singapore : Town and Country." *Geographical Review*, 1940, 30 : 105-106.

[11] In a few cases, F.M.S.R.-operated bus services replaced them ; an extensive door-to-door freight service was also introduced.

[12] Rawson, R. Rees. "Two New Railways in South-east Asia." *Geographical Journal*, 1946, 108 (*1-3*) : p. 85. Fisher, C. A. "The Thailand-Burma Railway." *Economic Geography*, 1947, 23 (*2*) : p. 85.

[13] The Japanese imported to Malaya 25, 12, and 7 locomotives, respectively, from Java, Japan, and Burma, and about 1250 wagons from Java.

[14] In 1943 the Japanese "restored" Kelantan—along with Trengganu, Kedah, and Perlis—to Siam. The pre-war frontiers were restored in 1945.

SCOTTISH SEAWEED RESOURCES

By Philip Jackson

Depending on the pigment which predominates, seaweeds are classified as Brown, Red, Green, and Blue-Green. It is the Brown Weed which predominates around the Scottish coast, which, with its rocky substratum, offers ideal conditions for the growth of marine algae. The shore is divided into two regions, the littoral region between low and high water and the sub-littoral region, below low water.

Until about 1850, the kelp industry was the sole source of alkali for the soap and glass industry, but this industry collapsed when cheaper sources of supply were discovered. It was revived as a source of iodine, but again collapsed when iodine became available from its natural deposits. Any future seaweed industry will be based on its organic constituents, of which the brown algae contain alginic acid, mannitol, laminarin, fucoidin, and a low-grade cellulose.

Alginic acid was discovered by Stanford in 1883, but the industrial importance of his discovery did not become apparent until the second World War, when it was found that fibres could be made of alginic acid and could be woven into a fireproof fabric which was used as a

LOCH SEAFORTH: CUTTING *FUCUS* ATTACHED TO BOULDERS

CANTY BAY: *FUCUS VESICULOSUS* AND *LAMINARIA DIGITATA* BEING COLLECTED FOR LABORATORY EXPERIMENTS

OCH NAN UAMH. UPPER ZONE: *PELVETIA*. MIDDLE ZONE: *FUCUS VESICULOSUS, F. PLATYCARP*
LOWEST ZONE: *F. SERRATUS, HIMANTHALIA DIGITATA, LAMINARIA DIGITATA, L. SACCHARINA*

LOCH NAN UAMH: *LAMINARIA DIGITATA* EXPOSED AT LOW TIDE

SUB-LITTORAL SEAWEED BEING HARVESTED WITH A SPECIALLY DESIGNED GRAPNEL

EXPERIMENTAL TRAWL USED IN CUTTING SUB-LITTORAL SEAWEED

camouflage material. To-day, alginic acid, or its sodium and calcium salts, finds wide application in all the major industrial countries in the world, in the manufacture of fibres, thickeners, protective colloids, insulating materials, textiles, foodstuffs, transparent papers, textile sizes, binding materials, pharmaceutical products, medicinal and surgical preparations, and so on. The alginates are also finding increasing application in the field of applied biology as absorbable haemostatics and dressings. They are being investigated for use in the filling of cavities in surgical techniques, and as a dusting powder to replace talcum which is known to elicit certain undesirable after-effects in surgical operations.

Mannitol, although isolated by Stenhouse in 1884, has had limited application because of high cost. It may be used as a substitute for sugar in diabetic diet, while its crystalline non-hygroscopic nature makes it valuable as a diluent for powdered medicinals and baby foods, as a tablet filler, and as a dusting powder for chewing gum. It can also be used in coatings for fancy papers and leathers, in the frosting of bottles and transparent containers, in shoe polishes, soldering fluxes, pharmaceutical products, and as a plasticiser. On nitration, it gives the explosive hexanitrate which is used in detonators. Nitromannite is also used to lower blood pressure in treatment of essential hypertension.

Laminarin, a glucose polymer, gives glucose quantitatively on hydrolysis and might, therefore, be regarded as an important source of this sugar.

Fucoidin has, up to the present, received very little attention, but it is fairly certain that, as with the other constituents of seaweed, new uses will be found as they become available in commercial quantities.

Scotland is more fortunate than most countries in the quantities of seaweed growing round its shores. A survey of littoral seaweed—growing between high and low water mark—carried out by the Scottish Seaweed Research Association, has revealed over 180,000 tons distributed as follows :—

Area	Tons	Acres	Tons/acre
Outer Hebrides	125,136	3,500	36
Inner Hebrides	8,263	278	30
Orkney Islands	38,774	1,813	21
Mainland, W and NW	8,540	356	24

It will be seen that 70 per cent. of the total littoral seaweed of Scotland is to be found in the Outer Hebrides, the most prolific growth being in North Uist, where Loch Maddy and Loch Eport alone support over 60,000 tons. Also the weed density is at a maximum in this area, an important consideration in commercial utilisation.

Map 1 shows the areas on the Scottish coasts, and maps 2, 3, and

4 on the coasts of Skye, Orkney, and the Outer Hebrides respectively, where a growth of 50 tons or more littoral seaweed to the mile was

Fig. 1. Scotland. Showing all areas worthy of general surveys (black) 50-100 tons/mile or detailed surveys (hatched) 100 tons/mile. The figures give the weed density in tons/acre for the Mainland, Mull and Arran.

found. It is believed that dense growth is only possible in areas subjected to a moderate wave action of enriched ocean water, which probably explains the comparatively scanty growth in the more

exposed western waters of the Mainland and Outer Hebrides and in the relatively quiet inshore waters of the east coasts.

The obvious choice of area for harvesting this type of seaweed in commercial quantities is the Outer Hebrides. Owing to the high water content of seaweed (75%) no industrial undertaking could stand the cost of transporting wet weed to the Mainland. It is, therefore, essential that it should be dried and milled before dispatch.

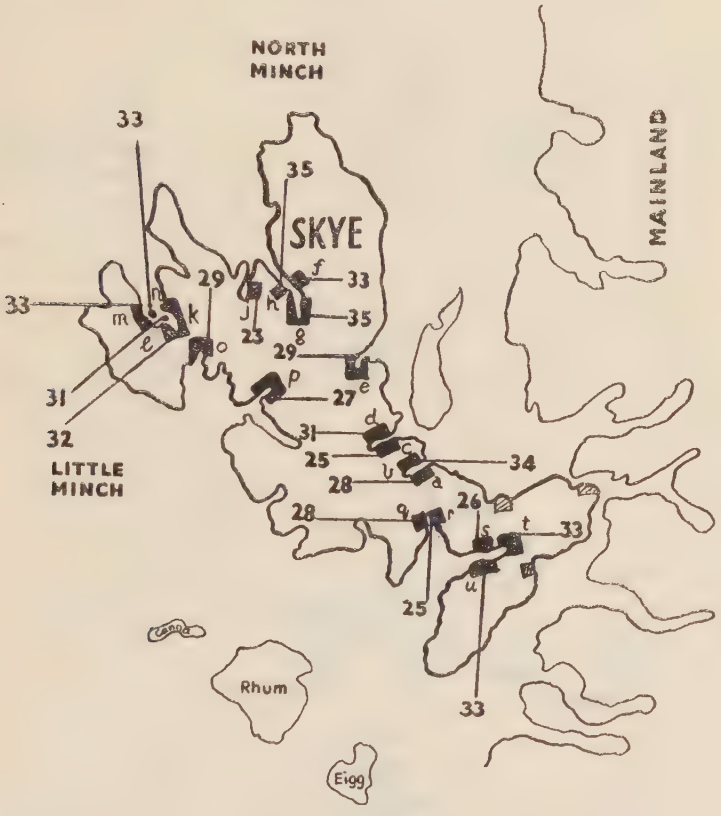

Fig. 2. Skye. Showing general surveys 50-100 tons/mile and detailed surveys over 100 tons/mile. The figures give the weed density in tons/acre.

The most economic means of removing such large quantities of water is undoubtedly to dry in two stages, first from 75% to 40% moisture content by spreading on grids in the open and drying under natural conditions, and then from 40% to 10% moisture content by the application of artificial heat in some form of continuous drier. Unfortunately, the prevailing weather conditions in the Outer Hebrides preclude the first stage for a large part of the year, and it would, therefore, be necessary to use artificial heat in both stages with consequent increase in costs of the dried product. Storage of weed is another difficulty in this area. After storage for short periods in humidities

of 75% and over, seaweed begins to decompose, even if it has been previously dried to 10% moisture content. Steps would, therefore,

Fig. 3. Orkney. Showing general and detailed surveys. Weed density as in Figs. 1 and 2.

have to be taken to reduce the storage time in the Outer Hebrides where humidities of this order are common, or to store the weed under conditions unfavourable to bacterial attack.

No mechanical system of harvesting littoral seaweed has yet been devised, but it can be harvested by hand with comparative

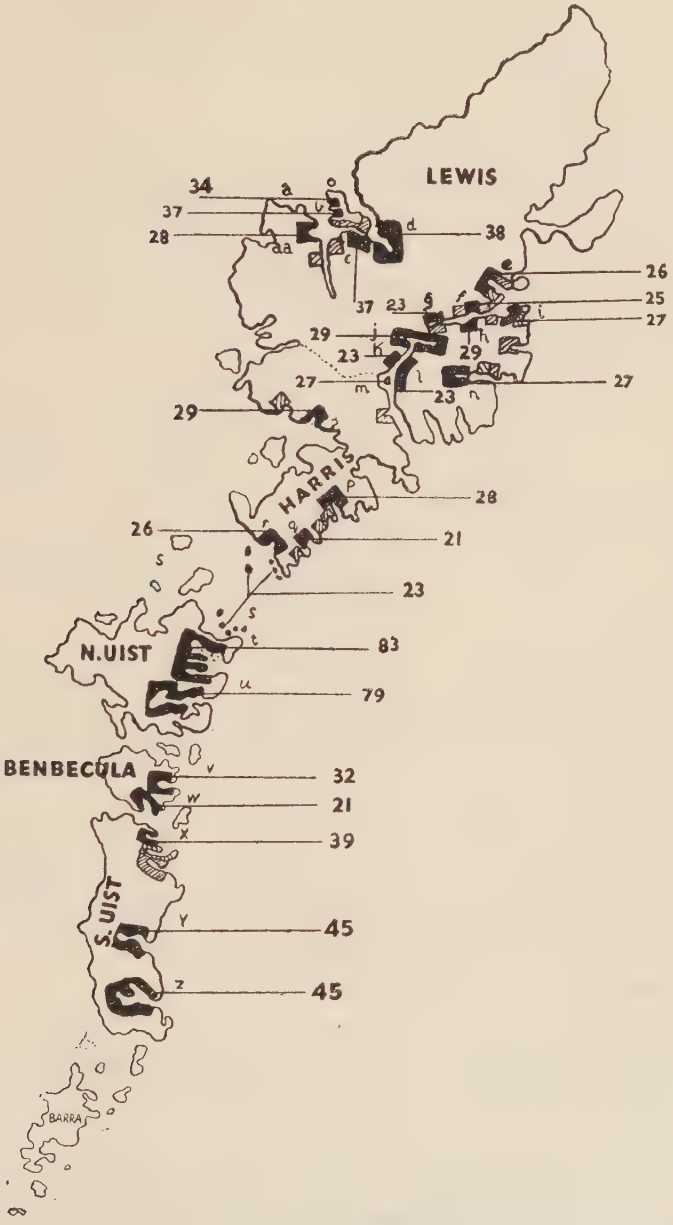

Fig. 4. Outer Hebrides. General and detailed surveys, and weed density.

ease, using serrated sickles and cutting when exposed by the ebbing tide. After cutting it can be netted and as, unlike sub-littoral weed, it floats, the full nets can be floated off the beach by the incoming

tide and towed by motor boat to a central point for drying and milling.

Sub-littoral seaweed is an entirely different proposition and introduces a number of far more difficult problems, particularly in survey and harvesting operations. It is, however, available in far greater quantity and, on the basis of present knowledge, is more valuable than littoral seaweed.

A suitable method of survey had to be developed before actual survey operations could be commenced. This has been done and the method found to give reasonably accurate results. The Association's survey of sub-littoral seaweed, to date, has indicated over 1,000,000 tons of sub-littoral seaweed in Orkney waters alone. Map 5 shows the areas surveyed to the end of 1947, a total of 16,000 acres, which were found to support over 25,000 tons of this type of weed, distributed as follows :—

Area	Tons of Weed	Acres	Density of weed in tons/acre	Dominant Species of Laminaria
SHAPINSAY :				
North	33,956	1,524	31·6	*L. Cloustoni* 51%
West	9,673	318	30·4	*L. saccharina* 43%
South-west	4,565	165	27·7	*do.* 70%
SANDAY SOUND :				
Linga Holm—NW Bay	888	44	20·2	*L. saccharina* 71%
Linga Holm—Links Ness	5,916	296	20·0	*L. Cloustoni* 61%
Spurness—Links Ness	10,188	990	10·3	*do.* 87%
Huip Holm—W	1,361	73	18·7	*L. saccharina* 58%
Huip Holm—E	971	46	21·1	*L. Cloustoni* 74%
Spurness—Backaskaill Bay	51,390	3,329	15·4	*do.* 79%
Backaskaill Bay—Els Ness	24,493	1,519	16·1	*do.* 72%
Backaskaill Bay	1,284	241	5·3	*do.* 84%
Ketteltoft Bay	428	86	5·0	*L. saccharina* 55%
Huip Ness, SE—Huip Holm, W	25,326	1,432	17·7	*L. Cloustoni* 84%
Papa Stronsay, NW	3,396	150	22·6	*do.* 77%
Papa Stronsay, E	1,922	97	19·8	*do.* 99%
ROUSAY SOUND GAIRSAY SOUND WYRE SOUND ST. CATHERINE'S BAY (Part) STY WICK (Part) MILL BAY	Data awaiting analysis			

The total potential sub-littoral seaweed bearing area around the Orkney Islands is approximately 90,000 acres.

The high water content of this weed (approximately 85%) precludes its transport in the wet state over long distances, as in the case of the littoral weed, and restricts the location of a factory for drying and milling to some site adjacent to the harvesting area.

Before sub-littoral seaweed can be harvested economically many problems must be solved, the magnitude of which are apparent from the conditions under which a harvester must operate. First, the weed has to be cut from a very rocky and uneven surface at a depth of 4-5 fathoms below sea level, and there is a considerable risk of anchoring on awkward obstructions on the seabed. The sub-littoral seaweed is

Fig. 5. Orkney. Sub-littoral zone weed survey to 31st December 1947. Shaded : sub-littoral seaweed areas surveyed. Black areas : littoral seaweed—100 tons and over per mile.

heavier than water and therefore sinks when it is cut, necessitating some positive form of transporting it to the surface being incorporated in the harvesting gear. Owing to the abnormally high water content, the harvester must operate at high efficiency and low cost in order to compensate for the collection of approximately six tons of water with every ton of useful raw material. A high degree of flexibility is essential to prevent damage due to pitching, tossing and rolling, not only of the boat but also of the gear on the seabed.

Navigational difficulties must also be taken into account in the design of a harvester. The optimum depth for harvesting sub-littoral seaweed is 4-5 fathoms. In many areas this is very close inshore, and if seaweed is there in sufficient quantity to justify harvesting on a commercial scale, it is inevitably a very rocky shore. Harvesting boats must, therefore, be of comparatively shallow draft but suitably engined and rigged to give a high degree of manœuvrability.

The drying of sub-littoral seaweed (particularly the stipe) under natural conditions takes a considerably greater time than does the littoral weed. Before it can be dried economically down to a moisture content of the order of 10%, it is necessary to subdivide the whole plant into smaller pieces, the optimum size of which still has to be determined. This is particularly true of the stipe, in which diffusion of interior moisture to the surface for evaporation is considerably retarded by a 'case-hardening' effect around the perimeter in the early stages of drying. It appears almost certain that the stipe and frond will have to be dried separately.

The location of the factories for the extraction of the constituent chemicals cannot be fixed by geographical considerations, although it is true to say that if processes could be devised using wet weed, then to locate the factory near to the source of supply would effect fairly considerable savings in cost by the elimination of the drying process.

These, and many other problems of a technical nature, are being actively investigated by the Scottish Seaweed Research Association, and, assisted by Government Departments, Universities and other research organisations and industrial concerns, the data necessary for the establishment and development of a seaweed industry is rapidly being acquired.

Figs. 1-4 are reproduced by kind permission of the Linnean Society of London; the photographs of Canty Bay, experimental trawl, and harvesting sub-littoral seaweed, by courtesy of the *Scottish Field*. The air photograph is Crown Copyright. The other photographs illustrating this article are by Mr. Robert M. Adam.

GEOGRAPHY AT THE BRITISH ASSOCIATION

THOUGH the meeting of the British Association at Brighton in 1948 was not so successful as that at Dundee in 1947, Section E (Geography) had a programme of considerable variety and scope. There were no Scottish contributions, and very few geographers from Scotland attended the meeting.

The President of the Section was Lord Rennell of Rodd, who has done so much in England to promote co-operation between different groups concerned with geography, and to convince others that geography is primarily concerned with people rather than with ice-caps and snow-fields. He gave a most interesting and timely

LOCH RIDDON: *ASCOPHYLLUM NODOSUM* AT MID TIDE

WATER SOUND

The white shorelines are sand. Irregular areas along the coast are rock on which seaweed, chiefly *Ascophyllum nodosum*, is established. The dark areas between Burray and South Ronaldshay show *Laminaria* beneath the water, interspersed light patches being areas of sand which is accumulating since the tidal stream between Scapa Flow and the North Sea has been prevented by the causeway connecting the islands. The four vessels E of the causeway had been previously sunk as a barrier.

presidential address, entitled "Geography as Social Science, with Special Reference to Africa," in which he stressed the function of geography as a bridge between the "natural sciences" and the "humanities," and the important part the social geographer could play in ensuring that new economic developments in Africa will be organised in a manner beneficial to native society as well as to European economy.

The other contributions were of two kinds: discussions in which several speakers took part, and papers embodying the results of original research. The first of the discussions, on "Scientific Aspects of Colonial Development," was conducted mainly by members of the Oxford School of Colonial Studies. The second, on the topical and controversial subject of "Movements of Population within the Commonwealth," was opened by Professor Fawcett and included contributions by an economist and two anthropologists. The third discussion was a joint discussion with the Geology Section on the denudation of the Weald.

The papers given the first morning had a local interest, three being on different aspects of the historical geography of Sussex, and the fourth, by Mr. E. W. Gilbert on the "Growth of Brighton," being a fitting prelude to the afternoon bus tour round the city. Two of the papers had particular interest for social geographers and those engaged in town and country planning. These were: "Mobility in the Location of Industry in Britain," by Mr. W. Smith, a useful examination of possible ways of assessing this significant factor, and "Ballydun, a Study of the Ulster Town," by Mr. J. M. Mogey. Other papers ranged from those with economic emphasis, such as "The Pre-war Hinterlands of the German Baltic Ports," by Mr. F. W. Morgan, and "Post-war Economic Developments in Egypt," by Mr. A. McL. Frood, through a regional study of economic and human significance on "The Canal Colonies of the Punjab: A Pioneer Zone of Agricultural Settlement," by Dr. F. J. Fowler, to purely physical topics in papers on "Chemical Weathering at Low Temperatures" and "The Geomorphology of North East Wales." The former was given by Professor Joseph Williams of Seattle, and told of experimental work, on the effects of snow melt, carried out on the mountains near that city, with geographers, geologists, and chemists co-operating.

On the Saturday and Sunday, Professor Wooldridge and Dr. Henderson conducted most interesting and instructive excursions to the central and western Weald—the latter excursion unfortunately hampered by the onset of a storm accompanied by torrential rain; but, on the return journey, the party had the chance of appreciating how rough the seas can be on the Sussex coast.

C. P. S.

TRISTAN DA CUNHA

Review by Professor R. N. Rudmose Brown, D.Sc.

Few tiny islands have had as much written about them as Tristan da Cunha and its associated islets. Half-a-dozen books and scores of articles, including one published in 1905 in this *Magazine*, all about ninety-five square kilometres and a population ranging from two or three to a few less than two hundred. Most previous visits were only for a day or two, since the island has neither harbour nor safe anchorage and lies in an area of storms and high seas which discourage a long stay. The Norwegian expedition of 1937-38 was the first scientific expedition to the island that made a long stay—four months—and conducted a systematic examination of the whole island, not only its geology, fauna and flora, but also the sociology and medical condition of its inhabitants.[1]

Until 1938, when Tristan da Cunha, Inaccessible and Nightingale, as well as the isolated Gough Island (Diego Alvarez), became nominally dependencies of St. Helena, the islands had been considered to be British—from 1816—but were entirely free from extraneous authority. Originally the expedition, of which these volumes are the valuable results, was planned to investigate Gough Island, of which very little was known except from a visit by the *Scotia* in 1904 [*S.G.M.*, 1905, 21 (*8*) : 430-440]. Then the Tristan islands were added to the scope of the expedition ; eventually Gough Island was excluded and all attention was riveted on the Tristan group.

The various results are bound in several volumes, and most are in English. The most exhaustive reports are those by J. C. Dunne on the volcanology, by S. D. Henriksen and P. Oeding on the medical survey, and a very long one by P. A. Munch on the sociology, which includes a detailed history of the settlement.

Tristan da Cunha with Inaccessible and Nightingale Islands are entirely volcanic in origin, and rise from the Mid-Atlantic Ridge. Their structural relationships are still rather obscure, since relatively deep water separates several of the islands. They appear to be associated with the Tertiary disturbances. Tristan itself has a main cone (alt. 2060 m.) with a crater lake, and a number of small cones on its flanks. There is no record of present or of recent activity. On the north-west side of Tristan da Cunha there is a comparatively flat area, of five by one-and-a-half kilometres, at an altitude of five to fifteen metres. No satisfactory explanation of this plateau is offered, but faulting may be responsible. It has a fairly fertile soil, and on it lies the settlement. Two other, smaller flat patches on the southern side have never supported settlements.

The natural resources of the island are few. Crowberries and wild celery are the only useful plants except the island tree (*Phylica*), which is the only source of fuel but does not provide constructional timber, the latter being derived solely from drift-wood and wreckage. Mollies and penguins and their eggs make good eating, and there are a few

sheep, cattle, pigs and poultry, and plenty of edible fish. Potatoes are the chief crop; little else is cultivated. Corn has been abandoned.

The island has rarely lacked population since 1810, but numbers have varied much, 188 in 1938 being the highest reached. These were descended from fifteen ancestors—Scottish, English, Irish, American, Italian, Dutch. All the eleven male ancestors were white ; the four female ancestors were 'coloured.' But the whole population has a 'white' appearance. It lives in thirty-six cottages, built of volcanic rock and thatched with tussock grass. New houses are less well built than the old ones. Life is primitive and lacking in many of the amenities of civilised existence.

In the past, communications with the outside world were more frequent. Whalers, and sailing ships on their way to the Far East and Australia, frequently called and bartered eggs, mutton, potatoes, and oil. This is all over : there are now no sailing ships, the islands do not lie on steamer routes, and the modern whaling factory is self-contained. For some years a warship made an annual visit, carrying mails and stores. In the near future the institution of a fish-canning factory is proposed. This would bring imported labour, neglect of agriculture, a higher standard of living and regular communication, but would it be a real benefit to the Tristans ? They have been called unenterprising because their life is primitive and they seek no participation in modern industrial society. But no community that can survive the wants and hardships of life on Tristan da Cunha can be called unenterprising. Their diet is monotonous, almost as monotonous as that of rationed Britain, and, of course, they have no tea, coffee, and sugar, unless a calling vessel supplies a few of these luxuries. It is noteworthy that even into this isolated island man has brought his corrugated iron, which now figures in the hideous roof of the otherwise well built little church.

Transport is by bullock cart and boat. The boat enables them to visit remote parts of the island for collecting eggs, penguins, seals, etc., to go hunting on the islets of Inaccessible and Nightingale, to visit passing ships and, of course, to pursue their main occupation of fishing. Boats used to be acquired by barter from whalers, or from shipwrecks, but nowadays the Tristans make their own boats, though materials are sadly lacking. Bartered canvas is now a substitute for sea-elephant hide, and is stretched on native timber or on drift-wood. The result is a frail but buoyant boat.

The most striking part, however, of this report lies in the contradiction of time-honoured beliefs that it offers. The inevitable in-breeding that such a community must show results in no marked physical and mental degeneration. One mental defective can hardly be cited as proof of such occurrences. Poverty does not result in signs of underfeeding and lack of physical vigour ; restricted diet leads to no prevalence of deficiency diseases : rickets are almost unknown. Lack of sunshine seems to lead to no ill results : teeth are noticeably sound. The ground on which the settlement stands is impregnated with organic waste ; there is no adequate drainage system, and nearly all the drinking water is contaminated, but no one seems to suffer in

consequence. Finally, the community is quite happy in spite of having no doctor, tax collector, policeman, orders in council, insurance stamps, or governor ; and only occasionally a parson, who is also schoolmaster.

Here perhaps is one of the very few examples of a real democracy, a term of which the inhabitants are entirely unconscious, but a state of affairs that they show no wish to change for a regulated and directed life. In fact, they seem to show little interest in the outer world. Less than half of the adults can read and write, but several cottages have a few books. It would be of interest to know their titles, and to gauge how far the Tristans' knowledge of other lands is gained from books and how far from personal experiences of some of their number. Attempts to persuade the Tristans to abandon their island and move to the mainland have never been successful. Poor as they are, they prefer the freedom of their island home. They are far too wise to risk the turmoil of the world, and so they shatter still another illusion : that civilisation is necessarily attractive.

[1] *Results of the Norwegian Scientific Expedition to Tristan da Cunha, 1937-1938.* Edited by ERLING CHRISTOPHERSEN. 10×6½. No. 1. A Short Account of the Expedition. By E. CHRISTOPHERSEN. 24 pp. 10 figs. No. 2. Volcanology of the Tristan da Cunha Group. By J. C. DUNNE. 145 pp. 44 figs. No. 3. The Lichen Genus *Placopsis* in Tristan da Cunha. By I. MACKENZIE LAMB. 4 pp. No. 4. De speciebus generis lichenum *Cladoniae* ex insulis Tristan da Cunha. By H. DES ABBAYES. 6 pp. No. 5. Medical Survey of Tristan da Cunha. By S. D. HENRIKSEN and P. OEDING. 147 pp. 42 figs. No. 6. The Pteridophytes of Tristan da Cunha. By C. CHRISTENSEN. 25 pp. 2 figs. No. 7. Echinoderms of Tristan da Cunha. By TH. MORTENSEN. 10 pp. 2 figs. 1 pl. No. 8. Corallimorpharia, Actiniaria, and Zoantharia. By O. CARLGREN. 12 pp. 3 figs. No. 9. The Marine Algae of Tristan da Cunha. By E. BAARDSETH. 174 pp. 75 figs. No. 10. Meteorological Observations. By E. CHRISTOPHERSEN and G. SCHOU. 24 pp. 3 figs. Sketch map. No. 11. New Phanerogams from Tristan da Cunha. By E. CHRISTOPHERSEN. 15 pp. 10 figs. No. 12. Fishes of Tristan da Cunha, with Remarks on Age and Growth based on Scale Readings. By E. SIVERTSEN. 44 pp. 17 figs. 8 pl. No. 13. Sociology of Tristan da Cunha. By P. A. MUNCH. 331 pp. 101 figs. Oslo : Det Norske Videnskaps-Akademi, 1946.

No. 14. Parasitical Micromycetes from Tristan da Cunha. By I. JORSTAD. 32 pp. 4 figs. No. 15. A New Land Nemertean from the Tristan da Cunha Group, and a Survey of the Genus, *Geonemertes*. By A. BRINKMANN, Jr. 24 pp. 8 figs. Oslo : Det Norske Videnskaps-Akademi, 1947.

GEOGRAPHICAL PAPERS

AN OUTLINE OF VEGETATION CHANGES WITH HUMAN IMPLICATIONS

REPORT of the Paper read by Dr. E. WYLLIE FENTON at the Meeting of the Society on October 22nd, 1948. The President was Chairman.

The best arable and grassland in Britain has been derived from old forest areas, mostly non-coniferous. If such land is neglected, it will slowly revert to some type of scrub, and ultimately to wood. The type of vegetation that develops either within open woods or on the site of felled woods may be largely determined by the nature and intensity of grazing. Dr. WYLLIE FENTON described the vegetation changes in Dalkeith Old Oak Wood as a striking effect of the influence of grazing by deer, sheep, and latterly by cattle. When a considerable time has elapsed since the trees

in non-coniferous woods have been removed and continuous light grazing follows, the vegetation that develops is often dominated by Bent and Creeping Soft Grass.

Selective felling in a small sessile oak wood in the Tweed Valley resulted in a ground vegetation showing a definite trend away from typical oak woodland. In some areas, Wavy Hair Grass occurs as an indicator of beginning podsolisation of the soil. In open coniferous wood, the grassland vegetation between the conifers sometimes develops into a closed community of this grass, which, like Creeping Soft Grass, is capable of enduring much shade, *e.g.* of bracken. At lower levels, and as grazing increases, the tendency is to develop a Bent type of herbage. The latter type of grassland may be improved by the presence of legumes, such as White Clover.

The planting of trees for amenity, shelter, and sport, not infrequently on potentially agricultural land, was also discussed by the author, who drew attention to the injudicious use of the land for crops, trees, or stock. In some parts of Scotland, hill grazings could be more profitably used for growing trees than for carrying sheep. In other parts, forestry and sheep farming may be successfully combined. Rotational planting and utilisation of woodland for stock has not been practised so fully in this country as elsewhere. For economic reasons, the extensive Deer "Forests" will probably remain as they are and show very little change in vegetation.

Outwith cultivated land, most of the vegetation of this country is the result of man's activities and grazing animals. Hence to-day we have the problem of declining rural population, particularly in the marginal and more remote areas. This recent tendency should be checked or remedied by the close integration of forestry with agriculture. Woods would supply shelter, timber, and fuel, and would prevent soil erosion and prevent flooding. Hill grazings have always been a difficult problem. So long as men and women were there, such areas improved, but nature reasserted her supremacy—the grazings deteriorated and bracken spread—as soon as the drift from the land began. Steady deterioration will continue unless good housing, the amenities of life, and adequate return for the labour involved in resettlement are provided. The Forestry Commission has already established some small communities. Agriculture, or agriculture plus forestry, should follow this lead. To initiate some of these desirable improvements will involve much work and a large capital outlay. Proper land utilisation is now a dire necessity. It is more than possible that the financial outlay might be a very good investment.

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SCOTLAND AND SOME TRENDS IN GEOGRAPHY: JOHN MURRAY, PATRICK GEDDES AND ANDREW HERBERTSON. By R. N. Rudmose Brown. *Geography*, 1948, 33 (*3*) : 107-120.

Abridged from The Herbertson Memorial Lecture delivered to the Royal Scottish Geographical Society and the Edinburgh Branch of the Geographical Association on March 5, 1948.

Sir D'ARCY THOMPSON, c.b., f.r.s. By W. T. Calman. *Nature*, 1948, 162 (*4107*) : 93-94. By J. L. Myres. *Ibid.*, p. 94.

THE SCOTTISH NATURALIST, with which is incorporated *The Annals of Scottish Natural History*, after an eclipse from 1939 to the present year, is now reappearing, under the editorship of Professor V. C. Wynne-Edwards and Dr. James W. Campbell, in its fifth series. The first number of the sixtieth volume, published by Messrs. Oliver and Boyd Ltd. in April 1948, deals mainly with birds. However, the policy of the periodical is to encourage a biological rather than a specialist outlook and to concentrate on recording original observations and ideas.

SCOTTISH ZOO AND WILD LIFE, the quarterly Magazine of the Royal Zoological Society of Scotland, is edited by Mr. T. H. Gillespie, and published by Messrs. Oliver and Boyd Ltd., Edinburgh. The first number (9×6. Pp. 48. Price 3*s.*)

is attractively produced and illustrated, and contains informative articles of zoological interest.

RECENT FLUCTUATIONS IN THE POPULATIONS OF PARISHES IN THE WEST HIGHLANDS AND ISLANDS, together with an Estimate of Present Numbers, and a Method of Estimating the Populations of Administrative Areas from Certain Ascertainable Data. By ROBERT S. BARCLAY, B.SC., PH.D., and F. FRASER DARLING, D.SC., F.R.S.E. 13×8. Pp. 10 (mimeographed). Strontian : Occasional Communication of the West Highland Survey, August 1948.

THE RIGHT HONOURABLE SIR HALFORD J. MACKINDER, P.C., 1861-1947. By E. W. GILBERT. *Geographical Journal*, 1948, 110 (*1-3*) : 94-99. Portrait.

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THE GEOGRAPHICAL BACKGROUND OF INTER-VILLAGE POPULATION MOVEMENTS IN NORTHAMPTONSHIRE AND HUNTINGDONSHIRE, 1754-1943. By A. CONSTANT. *Geography*, 1948, 33 (*2*) : 78-88. 6 figs.

THE POPULATION OF GUERNSEY : AN ESSAY IN HISTORICAL GEOGRAPHY. By G. H. DURY. *Geography*, 1948, 33 (*2*) : 61-69. 8 figs.

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STREAM DENSITY BETWEEN THE VISTULA AND BUG. By B. SZALKIEWICZ. *Annales Universitatis Mariae Curie-Sklodowska*, Lublin, 1947, 2B : 151-159. 3 figs. French summary : 159-160. 20 references.

ASIA

GEOGRAPHICAL RECONNAISSANCE IN SINAI. By E. de MARTONNE. *Annales de Géographie*, 1947, 56 (*304*) : 241-264. 7 figs. 13 photographs.

ACROSS THE EMPTY QUARTER. By W. THESIGER. *Geographical Journal*, 1948, 111 (*1-3*) : 1-19. 7 photographs. 2 maps (1 : 1,250,000). Discussion : pp. 19-21.

Continuing the investigations for the Middle East Anti-Locust Unit [see *S.G.M.*, 1947, 63 (*3*) : 134], the author, in 1947, undertook a further journey across the Rub'al Khali, and travelled through the northern Mahra country. The maps accompanying the account show many hitherto unrecorded features.

THE GEOLOGICAL SURVEY OF INDIA, 1846-1947. By Sir CYRIL S. FOX. *Nature*, 1947, 160 (*4078*) : 889-891.

THE MINERAL WEALTH OF INDIA. By C. S. Fox. *Records of the Geological Survey of India*, Vol. 76, *Bulletins of Economic Minerals*, No. 1, pp. 1-23. Mineral map of India (1 inch to 128 miles). 1942, reprinted 1946.

INDIA : MAIN POPULATION CONCENTRATIONS. By L. A. HOFFMAN. *Geographical Journal*, 1948, 111 (*1-3*) : 89-100. 5 figs.

Though some of the 1941 concentrations discussed have been altered by subsequent population changes, they remain substantially the same.

PRESENT CONDITIONS OF ROAD TRAVEL IN CHINA. By F. H. A. STABLES. *Journal of the Royal Central Asian Society*, 1948, 35 (*2*) : 144-150.

LANDFORM REGIONS OF MANCHURIA. By G. F. DEASY. Abstract : *Annals of the Association of American Geographers*, 1948, 38 (*1*) : 78-79.

THE MANCHURIAN IRON AND STEEL INDUSTRY AND ITS RESOURCE BASE. By A. RODGERS. *Geographical Review*, 1948, 38 (*1*) : 41-54. 3 figs.

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A GLIMPSE OF OKINAWA. By L. G. WOLF. *Journal of Geography*, 1948, 47 (*2*) : 41-51. 3 figs.

Note on the physical and human geography of Okinawa Shima.

AFRICA

SISAL PRODUCTION IN EAST AFRICA. By J. D. Krivine. *Canadian Geographical Journal*, 1948, 37 (*1*) : 28-35. 18 photographs.

DAKAR REVISITED. By D. Whittlesey. *Geographical Review*, 1948, 38 (*4*) : 626-632. 1 fig.

Description of post-war changes in communications, the port, business district, and the European and African city pattern.

POPULATION AND SETTLEMENT IN THE GAMBIA. By H. R. Jarrett. *Geographical Review*, 1948, 38 (*4*) : 633-636. 1 fig.

The population increased from a total of 199,520 in 1931 to 228,114 in 1944. The distribution of villages in relation to geological features is discussed, with reference to rice cultivation and other agricultural potentialities.

VEGETATION OF THE SOURCE OF THE NIGER REGION. By J. Adam. *Annales de Géographie*, 1947, 56 (*303*) : 192-200. 5 photographs. Sketch map.

AMERICA

NEWFOUNDLAND. By G. A. Mercer. *Canadian Geographical Journal*, 1948, 36 (*3*) : 103-129. 39 illustrations. 2 maps.

THE ST. LAWRENCE SEAWAY—NAVIGATION ASPECTS. By D. W. Hoan. *Canadian Geographical Journal*, 1948, 36 (*2*) : 53-69. 19 photographs. 2 sketch maps.

POWER POTENTIALITIES OF THE ST. LAWRENCE RIVER. By the Dominion Department of Transport. *Canadian Geographical Journal*, 1948, 36 (*2*) : 70-71. Photograph. Sketch map.

RIDING MOUNTAIN NATIONAL PARK. By L. Harrington. *Canadian Geographical Magazine*, 1948, 36 (*4*) : 180-191. 21 photographs. Sketch map.

Description of the National Park, of 1149 square miles, on the plateau of Riding Mountain, 175 miles NW of Winnipeg. The park is a game sanctuary, and also provides recreational facilities. Buildings are carefully " landscaped."

AN EXPEDITION TO THE LLOYD GEORGE MOUNTAINS OF NORTH EAST BRITISH COLUMBIA. By F. S. Smythe. *Geographical Magazine*, 1948, 21 (*3*) : 92-102. 10 photographs. Map.

ALUMINIUM RESOURCES OF THE UNITED STATES. By J. E. Collier. *Economic Geography*, 1948, 24 (*1*) : 74-77. 2 figs.

SWEDES AND NORWEGIANS IN THE UNITED STATES. By E. Haugen. *Norsk Geografisk Tidsskrift*, 1947, 11 (*5-6*) : 189-198.

CRATERS AND CRATER SPRINGS OF THE RIO SALADO. By E. R. Harrington. *Journal of Geology*, 1948, 56 (*3*) : 182-185. 1 sketch map. 6 photographs. 7 references.

Description of a little-known area some 45 miles NW. of Albuquerque, New Mexico, with about forty craters and travertine springs of exceptional interest.

GEOGRAPHIC REGIONS OF TEXAS. By W. T. Chambers. *Texas Geographic Magazine*, 1948, 12 (*1*) : 7-15. Sketch map.

TEXAS STATE PARKS. By G. K. Shearer. *Texas Geographic Magazine*, 1948, 12 (*1*) : 1-6. 6 photographs.

The state park system described covers 57,662 acres and includes 36 parks under direction of the State Parks Department, 9 historic parks under the Board of Control, and 516 roadside parks under the Highway Department. Big Bend National Park, bordering the Rio Grande, extends to some 700,000 acres.

PARÍCUTIN. By B. F. Lemert. Abstract : *Annals of the Association of American Geographers*, 1948, 38 (*1*) : 64-65.

THE FIFTH ANNIVERSARY OF PARÍCUTIN. By F. H. Pough. *Science*, 1948, 107 (*2790*) : 635-637.

A record of changes in the volcano and the surroundings observed by Mexican and American scientists on February 20, 1948. [Cf. *S.G.M.*, 60 (*1*) : 25 ; 62 (*3*) : 127 ; 63 : iii.]

LAND UTILIZATION IN COSTA RICA. By J. Leon. *Geographical Review*, 1948, 38 (*3*) : 444-456. 17 figs.

RECENT ACTIVITIES IN VENEZUELA'S PETROLEUM INDUSTRY. By G. S. Corfield. *Economic Geography*, 1948, 24 (*2*) : 114-118. 5 figs.

SURVEYING IN THE EASTERN ANDES OF CENTRAL PERU. By J. V. Harrison. *Geographical Journal*, 1948, 110 (*4-6*) : 223-225. 3 maps.

The areas between Huancayo to the Satipo river, and between Tambo del Sol and Huachón, were mapped during a geological expedition in 1945.

TRANSANDINE RAILWAY LINKS CHILE AND ARGENTINA. *Bulletin of the Pan American Union*, 1948, 82 (*5*) : 286.

On February 20, 1948, the Antofagasta-Salta railway, an important new route, was opened for trade between Argentina and Peru, Ecuador and Colombia as well as Chile. The line extends to about 559 miles and reaches an altitude of 14,680 feet at the Chorrillos Pass.

OCEANIA

LAND SETTLEMENT IN NEW GUINEA. By R. G. Bowman. *New Zealand Geographer*, 1948, 4 (*1*) : 29-54. 4 figs.

RECENT GEOGRAPHICAL LITERATURE ON AUSTRALIA AND NEW ZEALAND. By R. G. Bowman. *Geographical Review*, 1948, 38 (*2*) : 250-270. 48 references.

AUSTRALIA'S FRONTIER PROVINCE. By the Hon. C. L. A. Abbott. *Geographical Journal*, 1948, 111 (*1-3*) : 22-31. 4 photographs. Sketch map. Discussion : pp. 31-32.

A paper on the progress and development of the Northern Territory.

GEOGRAPHY AND NEW ZEALAND'S EXTERNAL RELATIONS. By L. K. Munro. *New Zealand Geographer*, 1948, 4 (*1*) : 1-14.

POLAR REGIONS

THE NORWEGIAN POLAR INSTITUTE. *Nature*, 1948, 161 (*4103*) : 987-988.

The activity of Norges Svalbard- og Ishavs-Undersokelser is being continued and expanded by the Norsk Polarinstutt established in Oslo on March 1, 1948, and directed by Dr. H. U. Sverdrup.

THE FRENCH EXPEDITION TO SPITSBERGEN IN 1946. By Y. Vallette. *Acta Geographica*, 1947, No. 2 : 9-11.

ARCTIC, Journal of the Arctic Institute of North America, Montreal [see *S.G.M.*, 1945, 61 (*1*) : 27], is a welcome addition to the periodicals devoted to polar regions. The first number, issued in 1948, contains many valuable articles, notes, and reviews, and is illustrated with photographs and maps.

CARTOGRAPHY

LIBRARY FILING, CLASSIFICATION, AND CATALOGING OF MAPS, WITH SPECIAL REFERENCE TO WAR-TIME EXPERIENCE. By L. S. Wilson. *Annals of the Association of American Geographers*, 1948, 38 (*1*) : 6-37. 1 fig.

SYMPOSIUM OF INFORMATION RELATIVE TO USES OF AERIAL PHOTOGRAPHS BY GEOLOGISTS. *Photogrammetric Engineering*, 1947, 13 (*4*) : 531-628. Illustrated.

A series of fourteen articles dealing with utilisation of aerial photographs in geological mapping and research, photogrammetric techniques, and the use of aerial photographs in college and university geology departments, together with a representative list of educational institutions in the U.S.A. offering special courses on the subject in the geological or geographical curriculum.

MAPPING ARCTIC ENVIRONMENTS. By E. Raisz. Abstract : *Annals of the Association of American Geographers*, 1948, 38 (*1*) : 108.

GERMAN MAPS OF NORWAY. By O. Trovaag. *Norsk Geografisk Tidsskrift*, 1947, 11 (*5-6*) : 247-252.

CARTOGRAPHIC WORK OF THE MINISTRY OF RECONSTRUCTION. By M. Foncin. *Revue de Géographie humaine et d'Ethnologie*, 1948, 1 (*1*) : 72-74. Map.

Brief survey of the plans (1 : 500, 1 : 1000, 1 : 2000, 1 : 5000) prepared in connection with the reconstruction of villages and towns destroyed or damaged during the war in France, and of regional plans (1 : 10,000 and 1 : 20,000). On the small map illustrating the article is shown the location of some 1600 communes scheduled for reconstruction.

THE MAP OF ZIKMUND Z PUCHOVA AND ITS ORIGIN. By B. Šimak. *Sborník Ceskoslovenské Společnosti Zeměpisné*, 1946, 51 (*1-4*) : 1-10. 7 maps. English summary : p. 10.

The history of the map of Bohemia attached to the Czech Cosmography of 1554 and reproduced in the article is discussed, with reference to earlier maps by M. Klaudian.

THE CARTOGRAPHY OF JAPAN DURING THE MIDDLE TOKUGAWA ERA. By G. Kiss. *Annals of the Association of American Geographers*, 1947, 37 (*2*) : 101-119. 14 figs.

THE NATIONAL AIR PHOTOGRAPHIC LIBRARY OF CANADA. By A. Stephenson. *Polar Record*, 1946 (1947), 4 (*32*) : 406-408. 2 photographs. Map.

GENERAL

RECENT THEORIES ABOUT THE ORIGIN OF THE SOLAR SYSTEM. By D. ter Haar. *Science*, 1948, 107 (*2782*) : 405-411. 1 fig.

GOALS AND TRENDS OF RESEARCH IN GEOLOGY AND GEOGRAPHY. By J. L. Rich. *Science*, 1948, 107 (*2788*) : 581-584.

INTRODUCTION TO THE USE OF STATISTICAL METHODS IN PHYSICAL GEOGRAPHY. By Ch. P. Peguy. *Revue de Géographie alpine*, 1948, 36 (*1*) : 5-101. 21 figs. 18 tables.

DYNAMIC CLIMATOLOGY IN GEOGRAPHIC STUDIES. By F. K. Hare. *Revue canadienne de Géographie*, 1948, 2 (*1*) : 9-16. 2 figs.

RECENT CLIMATIC FLUCTUATIONS AND THEIR INVESTIGATION. By H. W. Ahlmann. *Norsk Geografisk Tidsskrift*, 1947, 11 (*7-8*) : 290-326. 20 figs.

THE FORMATION OF BEACH CUSPS. By Ph. H. Kuenen. *Journal of Geology*, 1948, 56 (*1*) : 34-40. 3 figs. 4 photographs. 8 references.

LA REVUE DE GÉOGRAPHIE HUMAINE ET D'ETHNOLOGIE, published by Messrs. Gallimard, Paris, provides a unique medium for the survey and discussion of man in relation to his environment. The conception of human geography is expanded to cover that part of the field of science where may be co-ordinated, in relation to distribution, diverse studies of habitat, anthropology, sociology, demography, economics, prehistory, religions, languages, law, technology, etc. The *Revue*, under the direction of Prof. Pierre Deffontaines and M. André Leroi-Gourhan, is well produced and illustrated with photographs, diagrams and maps. It will be issued three times in the year. The first number (January-March 1948. 10½×7½. Pp. 128. Price 280 *fr.*) contains original articles, notes, reports—on institutes, societies, congresses, etc.—and reviews, also obituaries of Jacques Weulersse and Jean-Charles Leclerc. Administrative and editorial offices of the *Revue* : 5, rue Sébastien-Bottin, Paris, 7e.

THE INTEGRATION OF PHYSIOLOGICAL AND GEOGRAPHICAL CONCEPTS IN THE STUDY OF ENVIRONMENT. By D. H. K. Lee. Abstract : *Annals of the Association of American Geographers*, 1948, 38 (*1*) : 107-108.

ETHNOLOGY AND GEOGRAPHY. By A. Leroi-Gourhan. *Revue de Géographie humaine et d'Ethnologie*, 1948, 1 (*1*) : 14-19. 7 figs.

BETTER LAND USE : AN INTERNATIONAL PROBLEM. By H. Calkins. *Food and Agriculture*, 1947-1948, No. 3 : 192-195.

AFFORESTATION AS A WORLD PROBLEM. By H. G. Champion. *Journal of the Royal Society of Arts*, 1948, 96 (*4771*) : 430-437. Discussion : 438-439.

MARGINAL AND INTERIOR LANDS OF THE OLD WORLD. By C. B. Fawcett. *Geography*, 1947, 32 (*1*) : 1-12. 6 figs.

REVIEWS OF BOOKS

EUROPE

European Population Transfers, 1939-1945. By Joseph B. Schechtman. Preface by Adolph Lowe. 8½×5½. Pp. xi+532. 3 sketch maps. New York : Oxford University Press, 1946. London : Geoffrey Cumberlege. $5.00, or 21*s*.

This is a remarkably detailed study of mass population transfers undertaken by various governments during the second world war. The topics covered include the transfer of German minorities to Reich territory from the South Tirol, the Baltic States, Poland, the U.S.S.R., and the Balkans ; German resettlement programmes ; the transfer of non-Germans in E and SE Europe ; and, as a conclusion, some general observations on the problems of minority groups in nationalistic states.

By their very nature, such themes are extremely difficult to study. War conditions, lack of statistics, and language difficulties are considerable obstacles, and there is in addition the special difficulty of maintaining impartiality and detachment in handling a story of human misery and mass oppression. The author has tackled the problem with immense industry, and has built up a detailed picture of events chiefly from contemporary documents, newspapers, reports, and broadcasts. One must appreciate the special language qualifications which have made the task possible, and also admire Mr. Schechtman's objective presentation. As a survey of contemporary events which receive little attention in this country, the book is an important contribution.

One lack may be mentioned—that of adequate maps. At times, the reader finds it difficult to follow the place-names and fluctuating political boundaries mentioned in the text—for example, the Government General and the Warthegau—and because of their ephemeral character, recourse to an atlas is of no help. A number of clear maps could have added considerably to the value of the book.

W. B. F.

Land and Landscape. By Brenda Colvin, F.I.L.A. 8½×5½. Pp. xii+266. 17 figs. 106 illustrations. London : John Murray, 1947. 21*s*.

Topography and climate, soil and vegetation are the foundation which the human needs of shelter and food, work and relaxation ceaselessly impact and mould, to be remoulded in turn. The landscape architect, Brenda Colvin, stresses the inevitable relationship between these many elements and, of greater importance still, approaches this integration as an artist. Her interest is not merely in the design of the urban and rural scene, but rather in the creation of an environment satisfying the needs of man by the emphasis on beauty and fitness for purpose.

To-day, necessity has stimulated the re-exploration of Britain as a national and as many local entities, and the new synthesis of "Land Utilisation" is endeavouring to seek the relationship between the uses of land and between their protagonists. The landscape architect, the geographer, and the town and country planner have attempted this synthesis in isolated instances, but of all these the landscape architect, with his wide background and his sensing of the need for beauty, may well become the new exponent of a dynamic land utilisation.

Land and Landscape is most comprehensive and well illustrated. The basic principles put forward for land use and landscape design are supported by deep historical research and botanical knowledge, which render this book a valuable source of reference on these and many kindred subjects.

R. E. M.

Planning and the Countryside. By Jaqueline Tyrwhitt. 7½×5. Pp. 60. 12 figs. Glasgow and London : Art and Educational Publishers Ltd., 1946. 2*s* 6*d*.

For all who are interested in the wise utilisation of our limited land space this booklet provides a remarkable amount of salient facts and stimulating suggestions. The partition of the countryside, the production of fresh food, the utilisation of town wastes, the best use of the urban fringe, the decentralisation of industry, the country town and village of the future—topics within the purview of the Association for

Planning and Regional Reconstruction—are here effectively infused with the author's appreciation of both economic and aesthetic values. J. H. K.

I Return to Scotland. By S. P. B. Mais. 8½×5½. Pp. 274. 15 plates. 11 sketch maps. London: Christopher Johnson, Publishers, Ltd., 1947. 10*s* 6*d*.

One would like to be able to recommend Mr. Mais's new book on Scotland, were it only for the chapter on the exploitation of Glen Affric—with which lovers of beautiful scenery must agree, though they are apparently in a regrettable minority in Britain—and for its enthusiasm for Scotland and the Scots. But most of the chapters, particularly those relating to Orkney, Shetland, Mull, Skye and the Highlands, are full of such egregious mistakes in nomenclature and even actual fact that their carelessness at first astonishes and then irritates the Scottish reader.

Largs for Largo, Uist—twice repeated—for Unst in Shetland, Manor apparently for the Mound in Edinburgh, Arundale and Florigerry for Armadale and Flodigarry in Skye, Garisey and Wyne for Gairsey and Wyre in Orkney, are only a very few of the mistakes—they are surely more than misprints—in nomenclature, there are innumerable others. And what will the Orkneyman, or any Scot for that matter, make of such statements as that Rognvald "Kolsen" founded St. Magnus Cathedral in 1137 in memory of his uncle St. Magnus who was "assassinated at Calder [*sic*] in 1511"! Or the equally surprising statement that King Haakon died after the battle of Largs (1263) in the Earl's Palace in Kirkwall which was founded by Patrick Stewart in 1600, and that "Robert the Bruce is also supposed to have taken sanctuary here in 1106 (!) after his defeat at Methren [*sic*]."

One can only hope that should this book reach a second edition, Mr. Mais will show his enthusiasm for Scotland by revising it very carefully, if possible under the stern supervision of a Scot! I. W. H.

The Cathedral and Royal Burgh of Kirkwall. By John Mooney, F.S.A.SCOT. 9½×6. Pp. xv+251. 19 illustrations. Kirkwall: W. R. Mackintosh. Second edition, 1947. 21*s*.

The first edition of this valuable work, published in 1943, was out of print within a few weeks. Paper for a second edition was not released till 1947, and it is certain that the new edition will disappear as quickly as the first one and will be warmly welcomed by scholars and others. The author's masterly research—after a lifetime of study—has brought to light a mass of little-known facts about the history of the church founded in 1137 and dedicated by Earl Rognvald Kali (afterwards canonised as St. Rognvald) to the great Saint Magnus. In 1486, James III, in his capacity as Earl of Orkney, presented the building—which was the property of the Orkney Earls—to the Town Council and Royal Burgh of Kirkwall, an ownership unique amongst Scottish churches but which, after litigation in modern times, has been recognised both by the Crown and the reconstituted National Church of Scotland.

Mr. Mooney's book contains much which will interest geographers as well as historians about the "little-known northern town" of Kirkwall—which was called a "city" 147 years before the Royal Burgh of Edinburgh received that name in 1663. Not the least interesting parts are the appendices and addenda containing material not otherwise easily accessible as well as some valuable original research and suggestions by the author, in particular perhaps his "third pedigree" for the Orkney portrait of Mary Queen of Scots. His book contains many unusual and charming illustrations. The frontispiece is by Stanley Cursiter, R.S.A., a fellow Orkney-man. The Orcadian Press is to be congratulated with the author on such a worthy and artistic production. I. W. H.

Natural History in the Highlands and Islands. By F. Fraser Darling, D.SC., F.R.S.E. 8½×6. Pp. xv+303. 46 photographs in colour, 55 in black-and-white. 24 maps and diagrams. London: William Collins, Sons and Co. Ltd., 1947. 16*s*.

An adequate appreciation of this addition to *The New Naturalist* series might be expressed by a team of specialists, each dealing with one of the separate aspects of natural history which have been integrated by the author. The initial chapters are

fittingly devoted to general environmental factors—to geology and climate, relief and scenery, and the influence of man. " Man does not seem to extirpate a feature of his environment as long as that natural resource is concerned only with man's everyday life ; but as soon as he looks upon it as having some value for export that he can live by selling it to some distant populations—there is real danger." Dr. Fraser Darling describes life in the deer forest, grouse moor and sheep farm, and devotes a chapter to the life history of the red deer, and another, to that of the grey seal. Other parts of the book deal with the pine forest, birch wood and oak wood, with the summits of the hills, with the shore, the sea loch and the shallow seas, the sub-oceanic island, and with fresh waters.

The text, illustrations, bibliography, and the maps, drawn by James Fisher, all go to the making of an informative and very attractive book. It is an ambitious work, and criticism of several of the author's statements is unavoidable. But any detailed criticism would have to be tempered by the realisation of the spirit and skill which have moulded this survey. J. H. K.

Highways and Byways in the Central Highlands. By SETON GORDON, C.B.E. Foreword, and a glossary of place-name elements with aids to pronunciation, by W. J. Watson, M.A., LL.D., D.LITT. CELT., HON. F.E.I.S. $7\frac{1}{2}\times5$. Pp. xv+419. Illustrations by Sir D. Y. Cameron, R.A. Map. London : Macmillan and Co. Ltd., 1948. 10*s* 6*d*.

In this companion volume to his *Highways and Byways in the West Highlands*, Mr. Seton Gordon has made another careful and valuable contribution to the geography, history, and folklore of the Highlands, one which is sure to prove a standard work of reference. The region dealt with is a wide one, from the Trossachs to the Cairngorms—on which latter region, from lifelong acquaintance, the author is an acknowledged authority. Particularly valuable are his remarks on place-names of this and other districts, many of which, but for his timely collection, would have fallen into oblivion. In this branch of his study he has had valuable assistance from Professor W. J. Watson, who contributes a foreword and glossary of place-names with aids to pronunciation. The late Sir D. Y. Cameron's drawings add an atmosphere of power and serenity to a fascinating volume sold at a remarkably modest price. It is one which will certainly prove, as Dr. Watson forecasts in his foreword, a book " of lasting merit widely and deservedly welcomed." I. W. H.

In the High Grampians. By RICHARD PERRY. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 173. 32 photographs. 2 maps. London : Lindsay Drummond Ltd., 1948 15*s*.

This is a book by a naturalist for naturalists, but it will also be read with delight by less instructed nature-lovers anxious to become better acquainted with our native birds and their songs—which the author reproduces phonetically—as well as with the red deer and other animal and floral life of the high tops of Scotland. It is a fascinating account of two years of daily observations of wild life—from March 8th 1944 to March 30th 1946, with some later additions—made by Mr Perry " in that parish of Badenoch on the south-east marches of Inverness-shire known as Kingussie and Insh—a great faunal region and potential National Park."

Though the book is primarily one for bird lovers, many other branches of nature are included, not forgetting the patient sheep-dog, about whose hard lot Mr. Perry has some trenchant remarks to make which deserve the attention of all animal lovers. The book is illustrated by magnificent photographs and there are two excellent maps. I. W. H.

The Lake District and the National Trust. By B. L. THOMPSON. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. viii+223. 24 illustrations. Map (1 : 126,720). Kendal : Titus Wilson and Son Ltd., 1946. 10*s* 6*d*.

A very pleasant book : readable, well printed on good paper, adorned by many beautiful photographs, supplied with an excellent map and an index. It is pointed out that the preservation of the Lake Country for the enjoyment of posterity is really a matter of national as well as of local concern. More than one-third of the book is devoted to a brief account of the growth of the Trust, of its organisation, and of the manifold problems that face it as a landlord managing so many and such various

estates in the interests of the wider public, while, so far as possible, respecting and encouraging local life. There is a list of the properties owned by the Trust, and the greater part of the book consists of a description of them.

Here there is something for all tastes : topography, history, literary associations, farming and sheep-rearing, and frequent explanations of place-names. R. T. C.

Cornwall. By PEGGY POLLARD. 9×7. Pp. 48. Drawings and water-colours by Sven Berlin. 47 photographs. 2 maps. London : Paul Elek (Publishers) Ltd., 1947. 9*s* 6*d*.

Gay but not trivial, this little book conveys much information of the kind not found in guide books : about the Small People ; about rhododendrons—deadly poison to dairy goats ; about the goats themselves ; about elderflower champagne, unfamiliar saints, the Cornish language, seals and porpoises, harbours, the preservation of the coast of Cornwall, and about much else forby.

The drawings and water-colours are incongruous. The superb photographs and the maps—one by Christopher Saxton (1642), and the other (1 : 253,440) based on the O.S. map—together with the delightful text, constitute a welcome addition to the *Vision of England* series. J. H. K.

The Mountains of Snowdonia in History, the Sciences, Literature and Sport. Edited by HERBERT R. C. CARR, M.A., F.R.G.S., and GEORGE A. LISTER, B.SC. 8½×5½. Pp. xiii+312. 15 figs. 27 plates. 6 sketch maps. London : Crosby Lockwood and Son Ltd. Second edition, 1948. 15*s*.

Publication of the second edition—delayed by the war—of *The Mountains of Snowdonia* is to be welcomed, especially as a considerable portion of the district has now been scheduled for development as a National Park. This book treats of the many aspects of the region, sufficient to satisfy any reader wherever his tastes and interests may lie. Moreover, each is treated by an acknowledged authority in the particular field of study or pleasure. Reference need only be made, for example, to Sir John E. Lloyd's contribution on the legend and history of Snowdonia, to a chapter on mountaineering by Geoffrey Winthrop Young, and to Dr. Edward Greenly's well-illustrated account of the geology.

The new edition retains for the most part the original (1925) scheme of the book, divided into four sections : History, Science and Industry, Literature, and Sport. Certain chapters have been revised, and new ones written to bring the information up to date. No large map of the district is included, but National Grid references are given for Sheet 107 of the New Popular Edition of the One-Inch Ordnance Map. The sketch maps and illustrations are to be commended. Of the appendices, the first, a guide to the correct pronunciation of Welsh place-names, should be mentioned for not having been overlooked in such a comprehensive work.

R. M. P.

The Atlantic Islands : A Study of the Faroe Life and Scene. By KENNETH WILLIAMSON. Foreword by Eric Linklater. 8½×5½. Pp. 360. 35 photographs. 4 sketch maps. Glossary. London : William Collins, Sons and Co. Ltd., 1948. 16*s*.

The title, *The Atlantic Islands*, conjures up visions of the Azores and West Indies, and it comes as a shock to find that this book tells of a single group washed by semi-Arctic seas. The title of this book on The Faroes may perhaps be unfortunate, but everything else about it is excellent. Mr. Williamson was stationed in The Faroes during the recent war, and found there both a wife and the inspiration to produce a work which is both a text-book and literature.

It is seldom that we pick up a book written with sufficient artistry to enable us to recapture half-forgotten scenes, but the author has produced such a work. Descriptions, such as " The rocks go round the hills in irregular walls, as iron bands run round the staves of casks . . . ", and the mention of points, such as the long grass growing on the roofs of the houses, and the " endlessness " of the Faroese ring-dance, bring back The Faroes with a rush. The text is more effective than the photographs, which are many and excellent, but Faroe scenery does not take kindly to the camera.

Mr. Williamson nowhere raises the question which must immediately cross the

mind of every Scot : " Why have The Faroes not merely held, but actually increased their population ? " The reviewer visited The Faroes direct from a depopulated Shetland, and so found the question inescapable. He sought the answer from the Faroese themselves and from resident Danes and Shetlanders. The answer seemed simple and cruel : " Because of lack of opportunity to leave." English speech has enabled Shetlanders, Orcadians, and Hebrideans to man ocean-going ships and settle at the farthest ends of the earth, but a peculiar and archaic language has bound the men of The Faroes to their bare hillsides and fiords. C. R. V. G.

Fahrten in Island. By RUDOLF JONAS. Appendices by F. Nusser. 9×6. Pp. 199. 3 figs. 80 photographs. Map of Iceland (1 : 1,970,000) and of Vatnajökull (1 : 800,000). Vienna : L. W. Seidel und Sohn, 1948. $3.50.

This is a pleasant and well-illustrated account of Austrian expeditions to Iceland in the years 1934, 1936 and 1939, the last including an aeroplane flight over the Vatnajökull. It has little pretensions to be a record of scientific results, but it presents a large amount of information about means of present-day Icelandic travel, and the fine photographs illustrate many aspects of Icelandic geology, glaciology, volcanology and geography. For the rest, it is a record of travel in the Langjökull, Katla, and Vatnajökull regions, where great conflicts between volcanic fires and ice occasionally take place, resulting in most unusual geological phenomena which are at present the subjects of much controversy. The most recent scene of eruption under and through the ice, that of Grimsvötn in the Vatnajökull, was visited and is fully described. There is a special chapter, with good illustrations, on the Icelandic pony, that hardy and indispensable means of transport. A glossary of Icelandic terms is provided, but no index. G. W. T.

Bergens Byområde og dets geografiske Utvikling, 1900-1940. By TORE SUND. 10½×7½. Pp. 156. 88 figs. Skrifter fra Norges Handelshøyskole i Rekken Geografiske Avhandlinger, No. 2. Bergen : J. D. Beyer A.S., 1947.

This volume is the second of a welcome series published as the Norges Handelshøyskole series in Geography. The work as issued is not complete in that it will have a partner in No. 4 of the series, Atlas of Bergen, which will, incidentally, contain an English summary of the volume under review.

This work resembles the planning reports on various British cities, but carries the argument in a more geographical manner. Following a physical introduction to Bergen and its surroundings is a view of the building spread from 1702 and its effect on the pattern of settlement. The author then treats of the industrial and commercial activity—with reference to the number of workers engaged in the various works and shops—and gives an analysis of the time-fare effect of public transport on the spread of activities and dwellings. There is a brief but useful comparison of Oslo and Bergen.

This work, exceptionally well covered by bibliography and delightfully illustrated with maps and photographs, is a credit to the author, the printer, and the Norwegian School of Commerce under whose auspices it is issued. A. C. O.

The Land of France. By RALPH DUTTON and Lord HOLDEN. Foreword by Raymond Mortimer. 8½×5½. Pp. xvi+152. 133 illustrations. End-paper sketch maps. London : B. T. Batsford Ltd. Second, revised, edition, 1946. 12*s* 6*d*.

To a comfortably cultivated reader, who enjoys passing through the towns of France, this after-war edition will appeal. Real discernment is shown for the architecture of churches and châteaux dating from the rise of the Gothic to the *Ancien Régime*. " Gentle authors, may I join you ? " might well be a request, should the reader recognise them seated in some sunny *Place* near their car—marked E for England—exchanging appreciative, or amiably sardonic, comments such as would amuse, not pain, a passing citizen.

New features of this edition include general revision, a preface—and footnotes—indicating destruction in 1939-45, the foreword, and some new illustrations, often happily paired for comparison or contrast. [Cf. *S.G.M.*, 1940, 56 (*1*) : 37.]

A. G.

How do you do, Tovarish? By RALPH PARKER. 9×6½. Pp. 64. 16 isotype charts. 32 photographs. London: George G. Harrap and Co. Ltd., 1947. 7*s.* 6*d.*

This, the third volume in the series *The Soviet and Ourselves*, is by a journalist who has lived in Russia since 1942, and aims at presenting a view of the actual conditions prevailing there to-day. "To anyone used to services in the sense in which they exist in Western Europe the first view of Russia is bewildering in its shapelessness and lack of routine, and it is only when one realises that, during the brief period of history since the Revolution, the Russian government has been concentrating on public services of a less immediately apparent kind, such as fighting disease and illiteracy, that the strength of Russia is appreciated."

In this book, text and illustrations are designed to bring out that aspect of the matter, and they do so very effectively. It is an objective effort to show the real pattern of life in the home, in school, at work and at play. The pictorial charts and the parallel photographs—Russian and British—would of themselves repay serious study.

R. T. C.

ASIA

Middle East Journey. By RICHARD GOOLD-ADAMS. 8½×5½. Pp. viii+195. 22 photographs. Sketch map. London: John Murray, 1947. 15*s.*

This is a story of the author's travels during 1943 in the Near and "Middle" East, extending from Egypt to the Persian borders of Iraq, and from Transjordan to Cyprus. It consists of notes and comments, based on diary observations, anecdotes and later reflection, on the peoples and places of these desert plains and mountain borders, seen from the peculiarly detached and yet responsible standpoint of the migrant British soldier. A "potted history" of each of these Arab lands is included, together with brief but interesting accounts of their economic, social, and political problems.

The descriptive references to mountain landscapes in Kurdistan and Lebanon would have been improved by some suggestion of relief on the sketch map.

F. D. N. S.

Syrian Pageant: The History of Syria and Palestine, 1000 B.C. to A.D. 1945. By WILFRED T. F. CASTLE, M.A. 9×6. Pp. 184. 16 illustrations. Sketch map. London: Hutchinson and Co. (Publishers) Ltd., N.D. 21*s.*

This condensed history of Greater Syria puts 3000 years of wars, massacres, and rumours of war into a grim perspective: "upon its splendid stage has many a bloody tragedy been played out in downright earnest." The author makes good use of a rich English literature on this subject, for quotation and reference. He will be of most interest to the general reader in his occasional commentaries and interpretations of events, and his brief references to the geographical and social background, rather than in his summary story. For this is heavily charged with the full names of places and people—an amazing host of battles, castles, cities, sects, empires, kings, potentates, and politicians.

F. D. N. S.

Soil and Water Conservation in the Punjab. By R. MACLAGAN GORRIE, D.SC., F.R.S.E. Foreword by Sir Evan M. Jenkins, K.C.I.E., C.S.I. 10×7. Pp. viii+290. 47 figs. 27 plates. Lahore: Punjab Government (Book Depot), 1946. *Rs.* 5, or 7*s* 6*d.*

The author dedicates this book to his Indian colleagues of the Forest Service. In a foreword, and with emphasis, Sir Evan M. Jenkins designates it as a manual of soil and water conservation intended primarily for the use of officials concerned with land management in the Punjab. As such it is a severely practical work covering all known aspects of soil deterioration and erosion and the means for their prevention. The author has followed closely developments of the subject in the United States, but has modified and adapted American practice to suit Indian conditions in the light of his own experience. Water conservation, in all its aspects, is given special prominence. Great attention is given to practical details of field works and methods for carrying them out; written instructions are reinforced by numerous diagrams.

Space does not permit of adequate account of the detailed and valuable information, probably assembled for the first time, contained in thirteen chapters, of which the first, second and thirteenth will probably appeal most strongly to the lay reader. In the last chapter the author summarises his plans for a soil conservation service. This should be read by all, if only to reach comprehension of the extreme complexity of the problem, the varied interests involved and the need for correlation of information collected by different services each with its own point of view. The author barely disguises his conviction that, while laboratory research may proceed on its leisurely way, the vital problem is in the field, and enough is already known for it to be tackled there and now.

The diagrams are clear and the photographs well chosen. R. M. C.

Tibetan Venture : In the Country of the Ngolo-Setas. Second Guibaut-Liotard Expedition. By ANDRE GUIBAUT. Translated by Lord Sudley. 8¾×5. Pp. ix+206. 23 illustrations. 2 maps. London : John Murray, 1947. 16*s*.

This is an account of two young Frenchmen, directed by the combined interests of the Geographical Institute of the University of Paris, the Société de Géographie and the Musée de l'Homme, to explore the country north of Tatsienlou between the parallels of 31° N and 32° 30′ N, to demarcate the basins of the Blue and Yellow Rivers, and to locate the eastern limits of the Bayen-Khara mountains.

The last eight pages contain the geographical report, under the headings of Geographical Notes, Hydrology, Geographical Co-ordinates of a few localities and Altitudes of certain localities. The rest is a finely written translation of an account of the experiences of the party on the " venture," the people of the country and their ways.

The old trade route from Tatsienlou north-west to Lhasa was followed to Luho, thence the way went north. On a pass of apparently 16,200 feet elevation, about 35° 15′ N, 100° 25′ E, the party of five—two Frenchmen, two Tibetans, and a Chinaman—were ambushed, and M. Liotard and the Chinaman, Tze, lost their lives. The rest of the party escaped to Dekho and then returned to Tatsienlou. All equipment was lost during the ambush, but the greater part of the records of the various observations made were recovered. M. Guibaut was badly shaken by the disaster and was unable to accompany the search party from Dekho ; he also avoided the pass on his return journey and so did not contribute a stone to Liotard's cairn tomb. Perhaps this book is a gesture of atonement.

Lord Sudley's translation conveys amazingly the full range of the feelings of the author in his writing and descriptions, and by this makes the book peculiarly and attractively readable. R. E. C.

AFRICA

Liberia. By CHARLES MORROW WILSON. 8½×5½. Pp. 226. 27 illustrations. New York : William Sloane Associates Inc., 1947. $3.75.

This is a very readable account of a little-known African territory. The author is an American journalist, and the style and approach is what is to be expected. Had he been employed by the Firestone Company as publicity agent, he could not have painted a more glowing picture of the benevolence and wisdom of that firm's influence on Liberia. By contrast, his frequent comparisons of Liberia with other African territories, while revealing no knowledge of them, are to their disadvantage, and references are frequent to exploitation. He does not say so, but one presumes the Firestone Company runs at a profit.

His descriptions of other aspects of Liberia, while being lively and graphic, are no more objective, and there is a constant tendency to suggest that all is for the best in this best of all African territories—the kind of attitude that is normally induced in a visitor who makes a quick tour under official guidance and with official handouts. Knowing something of Africa, and reading between the lines, one fears that Liberia is at least as poor, ignorant, and disease-ridden as any other African territory, and one can but hope that the Republic, with Firestone help and guidance, will overcome these disabilities no less quickly than other territories.

There are excellent photographs but no maps. R. M.

In the Forests of the Night. By James Riddell. 9½×6. Pp. xiv+229. 97 illustrations. London : Robert Hale Ltd., 1948. 15*s.*

James Riddell and Kenneth Gandar Dower, armed only with twenty cameras, went into the forests of the Belgian Congo in search of adventure and photographs of animals. The fine pictures and the vivid if flippant text make this a most readable volume and one not devoid of geographical interest, for, if light-heartedly and incidentally, it creates a most lively picture of the country, particularly of its vegetation and wild life. R. M.

Wild Life in South Africa. By J. Stevenson-Hamilton. 8½×5½. Pp. 364. 2 sketch maps. London : Cassell and Co. Ltd., 1947. 12*s* 6*d.*

Colonel Stevenson-Hamilton has added one more very interesting work on the wild life of South Africa. It differs from a good many books in not being a catalogue of killings and of the various steps in encompassing the killings, nor a dissertation on the classification of the various mammals, birds, reptiles and fishes. The more interesting of the large animals are dealt with in a manner that will give both the sportsman and the naturalist equal pleasure and enlightenment.

In particular, when the habits, characteristics and peculiarities of the lion are described, one can only think of prolonged and careful investigation by a psychoanalyst of skill as being in any way comparable to the detailed description of the many-sided possibilities of behaviour at different times in different circumstances and with different individuals. It is probable that there has never before been such an interesting and yet so all embracing account of *Leo*, his ways and his family life. The chapters on the lion would alone make this a most fascinating work, quite apart from the excellent descriptions of the other animals. W. F. McD.

AMERICA

Outlines of the Geography, Life and Customs of Newfoundland-Labrador (*The Eastern Part of the Labrador Peninsula*). By V. Tanner. 10×6½. Vol. I. Pp. 1-436. Figs. 1-209. Vol. II. Pp. 437-909. Figs. 210-342. Bibliography : Pp. 827-909. Cambridge : University Press, 1947. 50*s* for the two volumes.

The author, Professor of Geography in the University of Helsinki, has produced in these two volumes what must prove to be the most authoritative work extant dealing with Labrador. First issued in *Acta Geographica* in 1944, this monograph is based upon information available in the literature and cartography, and, above all, upon observations made during the Finland-Labrador Expedition in 1937 and the Tanner Labrador Expedition in 1939.

In his prefatory notes, Professor Tanner modestly calls it " a systematic collection of material which, after its different parts have been supplemented, will render possible a sound generalisation such as ought to form a basis of a future presentation of the regional geography of that country." The introductory chapter presents a fairly full account of the early history of Labrador : the voyages of discovery, the early evidences of contact with Europe, the origin of the name Labrador, and early cartography. Then follows a very full examination of the land, its physiography and geological structure, and the effects of the Quaternary inland ice ; the leading oceanographical features of the Labrador Sea, the Labrador Current, the freezing and breaking up of the coastal waters, and tides and local currents; meteorology and climate ; vegetation and phenology ; and animal life.

The second volume contains the fullest account the reviewer has yet seen of the human life of the Labrador. In this account, the author briefly summarises the distribution, endemic groupings, and transitional state of the population, and considers, in detail, differences between the ethnic groups. He reviews the origin of the Eskimo more, perhaps, as a guide for future investigations, but giving a considerable insight into the history and anthropology, life and culture of the different groups. The section dealing with the Indians of Labrador, their origins, displacements and migrations, and the life and customs of the two main groups—Naskaupee and Montagnais—, and also that which deals with the White People—Liveyeres and Trappers—lack no interest, though somewhat more brief than the section concerned with the Eskimo.

No work about the Labrador coast would be complete without a review of the social work carried on in that challenging country, and Professor Tanner does full justice to the great work carried on by the Moravian missions in the more northerly parts, by the International Grenfell Association—at whose headquarters the reviewer had the privilege to meet, very briefly, Professor Tanner—and by the various churches which work there. The final sections deal with industry and trade, and the author gives his opinions, many of which are supported by men who have worked there, on the future of Newfoundland-Labrador.

The illustrations throughout are excellent, and a study of the bibliography shows that Professor Tanner has brought a keen mind to bear on the whole of his subject. He has spared no pains either in his field work or his literary research. N. B. S.

Newfoundland : Economic, Diplomatic, and Strategic Studies. Edited by R. A. MACKAY, PH.D., F.R.S.C. Contributors : The Editor, S. A. SAUNDERS, M.A., PH.D., A. M. FRASER, M.A., G. S. GRAHAM, M.A., PH.D., F.R.HIST.S., A. R. M. LOWER, M.A., PH.D., F.R.S.C., G. S. WATTS, M.A. Foreword by Sir Campbell Stuart, G.C.M.G., K.B.E. 9×6. Pp. xiv+577. Diagrams. 4 sketch maps. End-paper maps. Toronto : Oxford University Press, 1946. London : Geoffrey Cumberlege. 30*s.*

Issued under the auspices of the Royal Institute of International Affairs, this volume of economic, diplomatic, and strategic studies of Newfoundland is timely if only because of the island's projected political alignment. But it is also a most valuable contribution to our knowledge of the peculiar conditions that determine the proposed changes.

" For almost four centuries Newfoundland's economic life depended on a single industry, the fishery, and almost on a single product, dried cod." This statement by Professor Mackay in his excellent introduction is largely the key to the island's story, though wood and mineral products are more valuable to-day ; its consequences are fully detailed in the sections that follow. All aspects of Newfoundland—especially education and early history—are carefully examined by the expert contributors who tell us, among other things, that " The conjunction of a high rate of natural increase [of population], emigration, and low incomes for wage-earners and primary producers working on their own account points to a serious problem—pressure of increasing population on employment opportunities. For this problem no easy solution is in sight" (p. 134). " Advancement in housing, in health and well-being has been retarded by low educational standards and adverse social conditions " (p. 173). " If Newfoundland is to enjoy even a modest amount of prosperity in the post-war era, it must have access to world markets " (p. 234). " Continuous financial aid is, indeed, likely to be essential over any foreseeable future " (p. 239).

Appendices include statistical tables, official correspondence, and a bibliography. There is a good index. J. H. B.

Mexico South : The Isthmus of Tehuantepec. By MIGUEL COVARRUBIAS. 9½×6¼. Pp. xxviii+435+viii. 92 line drawings. 8 colour plates. 91 plates (photographs). London : Cassell and Co. Ltd., 1947. 45*s.*

The author, a Mexican, is Professor of Art History in the National School of Anthropology in Mexico City. A geographer of no mean talent, he is perhaps better known in North America as an artist, archaeologist, and anthropologist. In the densely packed pages of this volume he has produced a scholarly account of the life, art traditions, archaeology, and history of the many mixed races who inhabit the Isthmus of Tehuantepec. The North American idiom which creeps in here and there adds piquancy to the description.

Professor Covarrubias has travelled extensively amongst the various races, and describes their characteristics and daily lives with sympathy and understanding. No brief résumé could give any idea of the wealth of detail which he has accumulated in the course of many years of travel and study. The matter is so well set out, and illustrated so completely with the author's own paintings, drawings and photographs, that the work can only be described as encyclopaedic. An artistic map, an extensive bibliography, a glossary of Spanish terms and a dictionary in seven Indian languages also contribute to making this book a most valuable addition to geographical literature. R. R. W.

Mexican Kaleidoscope. By NORMAN PELHAM WRIGHT, F.R.G.S. 8½×5½. Pp. viii+175. 54 photographs. End-paper sketch maps. London : William Heinemann Ltd., 1947. 15*s.*

This book deals mainly with the capital city and northern part of Mexico, and the country is described from an Englishman's point of view. The author was Military Attaché during the recent war, and spent three years travelling about the country. A keen observer of all things Mexican, and with a philosophic turn of mind, he has produced a brief but well-reasoned account of the country and the people.

The book lives up to its title ; it is kaleidoscopic, and brilliantly written in the personal vein, which makes it very readable. The brief chapters on the Indians, Natural History, and Archaeology are concise but full of detail and interest. End-paper maps, good photographs, a bibilography and index complete a very well-produced volume. R. R. W.

Land of the Condor. By HAKON MIELCHE. Translated from the Danish by M. A. Michael. 8½×6. Pp. 252. Marginal drawings. 13 photographs. Edinburgh, Glasgow, and London : William Hodge and Co. Ltd., 1947. 12*s* 6*d.*

In *Let's see if the World is Round* it was obvious that here was an author with the gift of painting a clear word picture and of drawing a delightful marginal illustration to accompany it. Hakon Mielche has not lost this ability but, rather, has added to it in *Land of the Condor.* This book describes a most leisurely journey, mainly by rail, from southern Chile to the Atacama desert. He leaves the main line at innumerable points to make protracted trips to the coast or into the interior. By so doing, he covers a considerable part of this geographically interesting land, and in his book contrives to give us a most readable exposition of the human geography and history of this region. The life, manners, and customs of the Chilean peasants and town dwellers are as vividly portrayed as is the scenery of the mountains, plains, and coast.

The author has been particularly fortunate in his English translator, who, by his apt phrase, has been able to capture the gaiety and light-heartedness which runs through the whole book. There is, however, no map to illustrate the author's journeys. A. T. G.

POLAR REGIONS

Grønlands Historie : En Oversigt fra ca. 1500 til 1945. By FINN GAD. 10×6½. Pp. 272. Illustrated. Det Grønlandske Selskabs Skrifter, XIV. Copenhagen : Ejnar Munksgaards Forlag, 1946. *Kr.* 10.

Though Dr. Finn Gad traces the history of Greenland from prehistoric times, it is chiefly of the vast island's story since its first mention in early European records of the Middle Ages, right up to the present post-war period, that he treats in this interesting and succinct volume, which it is to be hoped will be translated into English, for the book comes at a time when World War II has awakened much fresh interest in this remote region of ice and snow and sunshine. In a world of radio, weather reports, and airways, the world's largest island can no longer remain isolated as in the past, when her earliest European colonists the Norsemen apparently perished or were absorbed into Eskimo culture, for lack of ships with which to keep up communication with the motherland.

Dr. Finn Gad has been teaching Greenlanders the history of their island at the Godthaab Seminary since 1937 and is a master of his subject. He has made of his book no mere recital, but a living and interesting description of this unique island-continent and its charming inhabitants. Not the least absorbing part of the book is the last section, 1905-1945, with its interesting notes on Greenlandic authors, poets, musicians and artists — for in poetry and art the Greenlander has something of his own to give the world. It is a fortunate example of a colony where the missionary came first and the trader second, and owing to the wise protection of the motherland, Denmark, the native Eskimo inhabitants have blossomed and increased as they have done nowhere else in the Arctic. I. W. H.

South with Mawson: Reminiscences of the Australasian Antarctic Expedition, 1911-1914. By CHARLES FRANCIS LASERON. 8½×5½. Pp. 223. 17 illustrations. End-paper sketch maps. Sydney: Australasian Publishing Co. Pty. Ltd. London: George G. Harrap and Co. Ltd., 1947. 12*s* 6*d*.

In this brief sketch of Mawson's expedition there is nothing that has not already been told in Mawson's *Home of the Blizzard* and in J. K. Davis' *With the Aurora in the Antarctic*. The author was a biologist at the base station and took part in several minor sledge journeys. He tells his story well, and his brevity saves the tale from that monotony which characterises so many polar books. The map might be fuller and the photographs more numerous. R. N. R. B.

CARTOGRAPHY

Catalogue of Maps in the Essex Record Office, 1566-1855. Edited by F. G. EMMISON, F.S.A., F.R.HIST.S. Foreword by E. Lynam, D.LITT., F.S.A. 11×8¾. Pp. xx+106. 4 figs. 6 plates in colour. 28 maps in half-tone. Map of Essex Hundreds and Parishes (1 : 126,720). Chelmsford: The Essex County Council, 1947. 21*s*.

Although primarily a catalogue of maps collected and available in the Essex Record Office, and as such of interest to students, this handsomely produced volume has a wider appeal. It has a valuable introduction, followed by a description of the growth and techniques of early Essex cartography, and of the major origins and associations of the maps, together with indications as to the ways in which the collection may best be used. The accuracy and beautiful presentation of some of the estate surveys is remarkable, and it is both interesting and profitable to compare the old maps with modern ones, say, with the six-inch Ordnance Survey sheets.

The student will be pleased with the convenient arrangement of the *Catalogue*—chronologically in the case of estate, enclosure award, public schemes, and county maps, and alphabetically for tithe award maps—and also with the short reference notes which accompany each entry. The cordial invitation to visit the collection, which Mr. Emmison extends to all interested, should not, if opportunity offers, be neglected. B. B. H.

Geschiedenis der Kartografie van Nederland, van den Romeinschen Tijd tot het Midden der 19de Eeuw. By S. J. FOCKEMA ANDREAE and B. VAN'T HOFF. 12½×9½. Pp. viii +127. English summary: pp. 104-121. 25 plates. The Hague: Martinus Nijhoff N.V., 1947. 15*f*.

The international reputation of the Flemish and Dutch cartographers is well deserved. This is a history of Dutch cartography with the focus on the geographical representation of the Netherlands throughout the ages. It is a connected and authoritative account, followed by a summary in English. The text is very well printed, and is illustrated with a fine photographic selection from the representative maps.

The Peutinger map and Ptolemy are the first to show Dutch territory, but not until 1357 does the first substantially correct sketch appear. Until the middle of the sixteenth century maps of a pictorial nature were developed, usually drawn from the top of church towers. Then the improvement in survey methods brought from Germany enabled more exact large-scale maps to be produced. Surveyors became numerous, but also practised alternative professions, which did not help to maintain an even standard. Van Deventer, a "very great geographer," was followed by Ortelius, who published in Antwerp in 1570 his famous world atlas, which established for Flanders its reputation as the centre of map production. The work of his scientific collaborator, Mercator, was presented in 1595. The centre then moved to Amsterdam. During the Eighty Years War, France took the lead, but excellent work was done by individuals—Balthasars, his son, van Buckenrode, van Langeren—culminating in the great atlas by Blaeu in 1648. Cruquius was the first to use submarine contours on large-scale maps (1729). But no national survey was forthcoming until Napoleonic times and the peaceful development of the modern state. The period of patchy cartography was ended, and, under the guidance of Krayenhoff and van Gorkum, with modern methods, splendid maps on different scales were produced by 1864, which remain substantially the maps of to-day. J. C. B.

BIOGRAPHY

Douglas of the Fir : A Biography of David Douglas, Botanist. By Athelstan George Harvey. 9×6. Pp. x+290. Bibliography. 7 illustrations. 4 maps. Cambridge, Massachusetts : Harvard University Press, 1947. London : Geoffrey Cumberlege. $4.00, or 22*s*.

The Douglas Fir is known, at least by name, to many. The man after whom it was named, and who was responsible for its coming to this country, is much less so. Nevertheless, his busy adventurous life and his tragic untimely death have been the subject of a fair amount of writing, nearly all of which has been drawn upon by the author of the volume under review. One publication not mentioned by him is R. Dow's paper " David Douglas, Scone : Botanist and Pioneer of Arboriculture " published originally in the *Transactions of the Perthshire Society of Natural Science*, 1910, 5 (*2*).

It is indeed well that Douglas's life should have been made the subject of a book so well written and so skilfully put together as this present publication. It has obviously been a labour of love, and there has been no haste in its preparation. It gives a full-length portrait of the humbly born young son of a Scone stone-mason, whose interest in natural history led him first to an apprenticeship in the Scone Palace Gardens, then, through employment at Valleyfield, near Dunfermline, to the staff of the Botanical Gardens at Glasgow then presided over by Dr. (later Sir) William Jackson Hooker. Hooker befriended the boy from the first, allowed him to attend his lectures, took him on botanical tours in the Highlands, and finally was the means of having him sent overseas as a plant collector for the Royal Horticultural Society.

Douglas's scientific travels took him to America where he explored the Pacific Northwest, California, Oregon, Washington, and finally the Hawaiian Islands, where in 1834, at the early age of 35, he was killed, apparently by falling into a pit intended to trap wiid cattle and in which there was already a wild bull. There was some suspicion of foul play which has never been entirely cleared up.

A partial list of the important plants which he introduced into this country was carved on the public monument erected to his memory in Scone. The plants themselves are his perpetual memorial, among them being, in addition to the Douglas Fir, such plants as the flowering currant (*Ribes sanguineum*) and the musk-scented monkey-flower (*Mimulus moschatus*) which so unaccountably lost its scent in this country. Mount Douglas in Canada was named after him fifty years after his death.

This book tells all this and more, and presents to us a vivid picture of a perfervid young Scot. Long may his type be with us ! W. B.

Arabian Days : An Autobiography. By H. St. J. B. Philby. 9½×6. Pp. xvi+336. 52 illustrations. London : Robert Hale Ltd., 1948. 21*s*.

The autobiography of one who has made great contributions to geography must have a permanent value, if only as a record of the personality of a noted explorer. But in addition, this book will surely be used in the future as a source for the historians who write on the political upheavals of the Arab world from 1914 to date : this, because of the important parts played by the author in the drama of Muslim politics, and especially in the early development of Iraq and Transjordan and, more recently, as the close associate of King Ibn Saud of Arabia. The special importance of his statement lies in his insistence upon principles to which he considered the British Government, which he served, failed to adhere : a disagreement which led to his resignation. Again, there is the fact that Philby " backed the right horse " in Arabia, as is now evident to all ; his early appraisement of Ibn Saud has been fully justified.

While the author, in this book, is not primarily concerned with his geographical observations, there are many incidental descriptions that enhance the interest of a well-written work. Thus Philby's impressions of the Punjab, when a young civilian, are valuable ; likewise the account of journeys in the swamps of the Mesopotamian delta during the first war. Moreover, there is a record of the very rare and sudden appearance of torrential monsoon rain over northern Arabia in the summer of 1945, and of the effects of the floods caused by it ; and he notes two previous occurrences recorded in A.D. 1021 and 1790 respectively. A. G. O.

In Memory of J. M. Shokalsky. Edited by I. J. KRACHOVSKY. 10×6½. Pp. 375. 30 illustrations. Bibliography. Moscow and Leningrad : Akademiya Nauk SSSR, 1946. 38 *roubles.*

The name of Yulii Mikhailovich Shokal'skii will be pleasurably recalled by older members of the Royal Scottish Geographical Society. In 1914 he contributed to this *Magazine* an article on Commander Vitkitskii's hydrographical expedition to the Arctic Ocean, and, in 1919, a communication on plans for a geographical and hydrographical expedition to the shores of Northern Siberia. In 1925, he sent some notes on geographical research in Russia, including a reference to his own oceanographical investigations in the Black Sea. On November 13 of the same year he delivered a short address, in Edinburgh, at an informal meeting of this Society, part of his notes being published in 1926 [*S.G.M.* 42 (*1*) : 23-25]. For his valuable contributions to oceanographical and topographical research he was awarded the Society's Research Medal during the 1930-1931 session. Attending many congresses and meetings in Europe and America, he made numerous personal contacts with leading geographers.

An account of his life and scientific activities is provided in the present volume by a number of authors, a hundred pages being devoted to a biography written by his daughter. V. P. Semenov-Tian-Shanskii and others contribute a chapter on Shokal'skii and his work as member and President of the Geographical Society of the USSR—Honorary President until his death on March 26, 1940, at the age of eighty-four. Other authors are responsible for chapters on Shokal'skii's researches in oceanography, hypsometry, cartography, and meteorology, and his successor, Professor L. S. Berg, assesses his work relating to the history of geographical science. There follow appreciations of Yulii Mikhailovich as a teacher and professor and as chief of the library of the Russian Naval Ministry. At the end of the volume are some of his hitherto unpublished writings, including his address at the Oceanographical Institute in Moscow in 1932 on the occasion of the sixtieth anniversary of the *Challenger* Expedition.

The most impressive tribute to his memory, however, is the fully indexed bibliography of his published writings, which takes up one hundred pages of this volume.

J. H. K.

Mariner of the North : Captain Bob Bartlett. By GEORGE PALMER PUTNAM. 8½×5½. Pp. x+246. New York : Duell, Sloan and Pearce Inc., 1947. $3.50.

Captain Robert Bartlett was the greatest ice navigator of his day, and spent most of the summers of his life in sealing, whaling, and exploring. In the *Roosevelt* he was associated with Peary, with whom he reached lat. 88° on Peary's polar march. He was with Stefansson's *Karluk* when she was crushed and sunk, and he made a splendid retreat to Wrangel Island and Siberia. Then for many years he was with his own *Morrissey* in Arctic Canada, Greenland, and Alaska. There is enough in his life for several books, but Bartlett was no writer. He was rich in the expressive rhetoric of the sea but shirked lecturing and public speaking. When he received the Special Medal from the Royal Geographical Society in London in 1910, he " hired an understanding Englishman " for two pounds to write his speech, which he then tore up by accident, and had eventually to improvise, with great success. There are many interesting sidelights on Peary, Amundsen, Andrée, and others, besides pictures of the Newfoundland sealing.

There are no illustrations, and by a strange oversight the only picture of Bartlett is on the back of the dust cover, instead of being inserted in the book. It is also a pity that there are no maps.

R. N. R. B.

EDUCATIONAL

This is Kenya. 5×7¼. Pp. 112. 104 photographs. Nairobi : The Kenya Information Office, 1947. 2*s.*

An album of excellent photographs illustrating every aspect of life in Kenya. The pictures are clear enough for use in an epidiascope, and should prove useful as a teaching set. The text is informative but very brief. It is to be regretted that th ere is only one map and that small and sketchy.

R. M.

GENERAL

Glacial Geology and the Pleistocene Epoch. By Richard Foster Flint. 9×6. Pp. xviii+589. 88 figs. 6 plates. Bibliography. New York : John Wiley and Sons Inc. London : Chapman and Hall Ltd., 1947. $6.00, or 36*s.*

This volume provides an exceedingly readable, comprehensive and well-documented account of the glaciations, glacial phenomena and climatic fluctuations of the Pleistocene or Recent Epoch.

Following upon a description of glacier ice and motion, the form and distribution of existing glaciers and ice sheets are discussed, with interesting data concerning all the principal glaciated areas of the world. There follow chapters dealing with all aspects of the former much greater glaciations of the recent geological past, also chapters dealing with Pleistocene Chronology, Changes in Level of Land and Sea, Causes of the Climatic Fluctuations, and the Fossil Record. Many useful tables, diagrams, and maps are included.

A fine balance has been kept in the presentation of the facts, and the author has obviously taken much trouble to make the account comprehensive, in the sense that data relating to all regions of the world have been sought out and presented to the reader. For this alone the book is very valuable. On the theoretical side, too, hypotheses—on climatic fluctuations, for instance—have also been set out with a judicial fairness and impartiality that is to be admired and commended.

Altogether, it is a good book, which can be thoroughly recommended to the general reader as well as to the more expert. J. B. S.

Plough and Pasture. By E. Cecil Curwen. 7½×5. Pp. iii+122. 21 figs. 14 plates. Past and Present, Vol. 4. London : The Cobbett Press, 1946. 7*s* 6*d.*

This small book contains, in broad outline, the story of food production from earliest times to the present day. It deals principally with the prehistoric background to agriculture and with the developments which have occurred with the inevitable establishment of industrial food production in place of peasant cultures.

The author discusses the origins of agriculture and stock breeding and the spread of agriculture. Industrial food production, as we now understand it, must have originated, according to archaeological evidence, within an area bounded by the Nile on the west, by the Indus on the east, and by parallel of latitude 44° on the north. From this centre agricultural knowledge spread to many parts of Europe, Africa and Asia, but nevertheless there seems little doubt that the agriculture of the New World and, possibly, that of China were independent discoveries based on the cultivation of different crops and on the domestication of different animals. Pastoralism and agriculturism appear to have arisen simultaneously, but the form of food production in which peoples were engaged had a pronounced effect upon their cultural activities : agriculturists, sedentary peoples, had time to develop science and the arts, whereas the nomadic pastoralists, with little time or opportunity for writing or experiment, have contributed instead in the realms of philosophy, of religion and of oral tradition.

In addition to numerous photographs, including aerial photographs, this book is enriched by a wide variety of illustrations, and there is a comprehensive bibliography at the end of each chapter. P. M. H.

Revolution of Environment. By E. A. Gutkind. 8½×5½. Pp. ix+454. 60 figs. 74 plates. 3 maps. London : Kegan Paul, Trench, Trubner and Co. Ltd., 1946. 30*s.*

This volume, the second by Dr. Gutkind in the series *International Library of Sociology and Social Reconstruction*, consists of six essays, designed to illustrate, from as many sides as possible, the problems of human settlement in relation to environment. The first three are specifically related to problems of planning ; the need for a rational relationship to be established between the street with its dynamic functions, and the houses which are static ; the author's concept of a school and a curriculum for the planners of the future in which he recognises the part geography has to play ; and, finally, the need for an International Society to promote world unification.

The remaining essays contain much material of interest to the geographer. The

first is a short account of the organisation of settlement on a collective basis by the Jesuits in South America at the end of the seventeenth century. It is followed by a survey of rural and urban settlement in China with its geographic and socio-economic foundations illustrated by village functional plans, some unfortunately very poorly reproduced. The last essay deals with the colonisation and settlement of Russia, followed by a long and useful bibliography.

The collection of plates, with explanatory text, at the end of the volume is almost complete in itself. K. W.

World Words: Recommended Pronunciations. By W. CABELL GREET. 9½×6. Pp. liii+608. New York: Columbia University Press, by arrangement with the Columbia Broadcasting System. Second edition, revised and enlarged, 1948. London: Geoffrey Cumberlege. $6.75, or 37*s* 6*d*.

This list, of twenty-five thousand of the difficult names, terms and common words which have been before the American public since 1939, was compiled for the Columbia Broadcasting System. It incorporates work on pronunciation done by the B.B.C. and the P.C.G.N. The practical problem was not to give the correct native pronunciation of foreign names, but to recommend pronunciation which would fit naturally into the rhythm of American speech without impeding the listener's identification of the persons and places named. It was resolved with a skill and good judgment which make the book an important record in the development of American conventional usage. To announcers who have to say names like Dúnlaoghire it must be invaluable.

It has faults but very few misprints. For use now, there are too many Albanian names but not enough Icelandic. The Hari Rud and the Helmand are not in India. And the names Fandi i Madhe—better Fan i madh, Jean de Lattre de Tassigny and Henri Carton de Wiart are listed under the wrong elements. Foreigners will reject many of the recommendations. The reviewer, for instance, takes exception to those for Bondi, Dongara, Fiji, Geographe, Marree, Nullarbor and Oodnadatta. Nevertheless, British students who take the trouble to apply the keys to pronunciation given on pp. lii and liii, and who do not forget that the pronunciations recommended are American, will find the book useful, reliable, and a measure of the divergence between British and American usage. M. A.

Compass of the World: A Symposium on Political Geography. Edited by HANS W. WEIGERT and VILHJALMUR STEFANSSON. 8+5½. Pp. xvi+466. 39 figs., with maps by Richard E. Harrison. London: George G. Harrap and Co. Ltd., 1946. 15*s*.

This series of twenty-eight essays in political geography is of wide interest, and one hopes that it will reach and impress those politicians who are often sadly in need of a geographical basis to their politics. Many of the essays are reprints of earlier publication but are none the less desirable. Specially to be commended are essays on the "Heartland" and "The Northward Course." Among the authors are Sir Halford Mackinder, Ellsworth Huntington, V. Stefansson, and I. Bowman.

A few of the authors use the term geopolitics, a useful and significant term if it had not been so besmirched by Nazi writers in their specious arguments in support of their monstrous doctrines. It might be well to drop the term, at least for a time. R. N. R. B.

British Sources of References and Information: A Guide to Societies, Works of Reference, and Libraries. Edited by THEODORE BESTERMAN. 8½×5½. Pp. ix+56. London: Aslib (for the British Council), 1947. 6*s*, or 5*s* to Aslib members.

Within this slim book, the editor has succeeded in condensing and arranging information concerning the wealth of books in British libraries and of subjects dealt with in special collections. A description of the functions of the National Central Library is followed by brief accounts of the leading library and book organisations, and of the copyright, university, and principal public libraries. Select lists of special and government libraries, and of general works of reference, are also contained in this serviceable publication. J. H. K.

Britain and Her Export Trade. Edited by MARK ABRAMS. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 329. London: Pilot Press Ltd., 1946. 15*s*.

Most of the contributions to this symposium fall into one of three groups: an introductory and popular exposition of the general character of international trade; chapters on the trade of the U.S.A., the U.S.S.R., the British Commonwealth, Continental Europe, Latin America, and the "Middle" East; chapters on certain branches of British trade—shipping, coal, cotton, and tourism.

The chapter on the interrelation of domestic economic policy and international trade, by T. Barna, with its emphasis on the critical significance of the economic behaviour of the United States for the world economy, and on the desirability of planned multilateral trade, deserves particular attention. In the regional chapters, Oleg Hoeffding provides useful diagrams to illustrate the Soviet five-year plans. The other chapters in this and in the third group provide convenient sketches of the historical background of their topics for the inter-war years.

C. J. R.

A Book of Voyages. Edited by PATRICK O'BRIAN. $8\frac{1}{2}\times5\frac{1}{2}$. Pp. 274. Decorations by Joan Burton. London: Home and Van Thal Ltd., 1947. 15*s*.

The editor has gathered together a number of contemporary accounts of seventeenth and eighteenth century travels by sea and land. The sea voyages are generally unpleasant, but during this era sea voyages must have been few and far between. The travels by land are the agreeable reminiscences of enthusiastic travellers in Europe, India, and the Far East. None of the voyages is of great consequence, but together they give an excellent picture of travel conditions over the century and a half prior to the French Revolution.

C. R. V. G.

Portuguese Voyages, 1498-1663. Edited by CHARLES DAVID LEY. $6\frac{3}{4}\times4\frac{1}{4}$. Pp. xxii+360. Everyman's Library, No. 986. London: J. M. Dent and Sons Ltd., 1947. New York: E. P. Dutton and Co. Inc. 4*s* 6*d*.

This welcome addition to the Travel section of *Everyman's Library* contains a number of extracts from Portuguese records of travel: beginning with Vasco da Gama's first voyage up to the arrival at Calicut, and ending with Godinho's overland return from India, translated by the editor.

Selection in so vast a field presented a delicate problem which has been on the whole discreetly solved. But the devotion of nearly half the volume to a long and mostly fictitious extract from the Peregrinacão of Fernão Mendez Pinto (Cogan's translation with some of the errors corrected) does not seem justified here even by its very high value as romantic literature. This includes the wildly fantastic journey from Tartary to Cauchimchina by water all the way in just over two months. On the way these argonauts crossed the fabled lake from which flow the river(s) of China as well as the Mekong, Salween, Irrawaddy, and Ganges. Pinto alludes to it in five separate passages of his book, with four different names, the rivers varying in number from three to five and with new names each time. This fairy-tale is gravely annotated with identification of nearly all the weird place-names of Pinto's fancy—and such identifications! The information about the lake and its daughter rivers is indeed pronounced "not reliable." But the lake is of the essence of the story. It being mythical, as it clearly is, so is the rest. The editor's identification of it with Lake Tungt'ing far down the Yangtze is hopelessly at variance with the idea of the Central Asian lake from which all these rivers flow. On another occasion Pinto alleges he reached it from Siam without entering China. The editor was apparently unaware that for Pinto and his contemporaries Cauchimchina was Tongking and Northern Annam: so the notes take him to Saigon in modern Cochin-China, and then *up* the Mekong and by another astounding inland voyage to the neighbourhood of Canton. Pinto says he went down river from somewhere in his Cauchimchina and then, obviously, by sea to the Canton estuary.

The introduction is good but also in places a little less than critical. It is startling to-day to find "Sir John Mandeville" cited as a real traveller on a par with Marco Polo. Most welcome are two narratives of shipwreck from the *Historia tragico-maritima*, rendered by the editor in English prose which well conveys the poignant simplicity of the originals.

In spite of flaws a highly commendable book.

H. C. M.

A Book of Recent Exploration. By CHARLES E. KEY, M.A., F.R.G.S. 7¼×5¼. Pp. 233. 13 illustrations. 11 sketch maps. London : George G. Harrap and Co. Ltd., 1946. 8*s* 6*d*.

This book comes under the heading of adventure rather than serious geography. Too much has been crowded into too little, and some of the expeditions to which space has been given might well have been omitted. The sketch maps provided are of little value, since again and again they fail to show the discoveries made by the expedition to which they refer. C. R. V. G.

MAPS AND ATLASES

The "Contour" Road Book of Scotland. By HARRY R. G. INGLIS, F.R.S.G.S. Revised and extended by R. M. G. Inglis. 6×3½. Pp. xvi+288. 500 maps and plans. Edinburgh : Gall and Inglis. Twentieth Revision, N.D.

The new edition of this familiar vade-mecum contains road profiles and distances, and indications of places of interest, besides other useful information, such as ferry charges, a tide table, sunset and lamp-lighting tables, etc. The ten-inch map, showing the numbers of the routes dealt with, considerably adds to the value of this well-established publication.

Norway in Maps. By TORE SUND and AXEL SØMME. 10×7½. A. *Text-Volume.* Pp. 96. B. *Sketch Maps and Photographs.* Pp. 52. 82 figs. C. *Maps* (Norges Geografiske Opmåling). Index map (1 : 2,800,000). 19 maps (1 : 200,000). Skrifter fra Norges Handelshøyskole i Rekken Geografiske Avhandlinger, Nos. 1-2. Bergen : A. S. John Griegs Boktrykkeri, 1947.

Here is a fine study of Norwegian geography, with a detailed analysis of selected land forms and of human activities. The nineteen maps have been well chosen to illustrate typical landscapes : they are sheets of the official Norwegian surveys, some a little out of date, but, together, representative of different land forms and different means of utilisation. First published in Norwegian, their usefulness has wisely promoted an edition in English. R. N. R. B.

Kleine geologische Overzichtskaart van Nederland op de Schaal 1 : 600,000. GEOLOGISCHE STICHTING, AFDELING GEOLOGISCHE KAART. Explanatory text, and summary in English. 11¼×8. Pp. 16. Map : 22¼×19½. The Hague : Staatsdrukkerij, 1947.

Reduced from the 1 : 50,000 geological map of the Netherlands, this small-scale map is not only of a convenient size but conveys the information very clearly in the conventional colours. On account of the extent of the younger formations, fourteen different Holocene and ten Pleistocene deposits are shown, whereas Tertiary and Mesozoic have not been subdivided, though outcrops in the eastern part of the Netherlands are sketched in a text figure. Upper Permian, containing thick salt deposits, has been discovered in borings ; Lower Permian has not been met with, and nowhere in the Netherlands are there Permian outcrops. The map and text are valuable for teaching and reference purposes.

Maly Atlas Polski [*Little Atlas of Poland*]. Edited by JERZY KONDRACKI. 8×12¼. 28 maps in colour. Warsaw : Glówny Urzad Pomiarów Krajy [Head Office of Survey], 1947.

Prepared jointly by the Polish Survey and the Polish Geographical Society, this little atlas provides much useful information. The first five maps (1 : 12,000,000) show past and present frontiers of Poland, bronze age settlements. The other maps and map-diagrams (1 : 5,000,000) deal with topography, natural regions, waterways, soils, minerals, population, agricultural holdings, land utilisation, live-stock, forests and mills, mines and oilfields, industry, electric power, railway traffic, postal services, ports, co-operative societies, education, cultural life, hospitals and medical services in post-war Poland.

AGNES McCALLUM SCHOLARSHIP IN GEOGRAPHY

The Agnes McCallum Scholarship in Geography has been awarded to Miss JEAN M. S. BOWIE, who graduated with First Class Honours in Geography recently at the University of Glasgow. Miss Bowie has also gained the James Fleming Scholarship in Natural Science, and has proceeded to the University of California for a year's postgraduate study.

THE GEOGRAPHICAL MAGAZINE

Members of the Royal Scottish Geographical Society are now entitled to subscribe to *The Geographical Magazine* at the special rate of 15*s* 6*d* per annum. This privilege will, no doubt, be much appreciated.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

PROCEEDINGS

MEETINGS OF COUNCIL were held on 19th October and 30th November 1948.

ANNUAL GENERAL MEETING

The Annual General Meeting was held in the Society's Rooms in Edinburgh, 6th October 1948, the President in the Chair.

The Annual Report of the Council and the Financial Statement were unanimously adopted.

Douglas A. Allan, D.SC., F.R.S.E. and Sir Edward B. Bailey, D.SC., F.R.S., were elected additional Vice-Presidents.

The following members of the Society were unanimously elected to fill the vacancies existing on the Council :—

Mrs. K. L. Addison-Smith ; Lt.-Col. G. Dalyell, C.I.E., of the Binns ; Colonel T. E. Durie ; James B. Hamilton (Glasgow) ; Robert Kerr, M.A. ; A. T. A. Learmonth ; Miss D. M. Munro (Aberdeen) ; J. E. Richey, B.A., F.G. ; C. J. Robertson, PH.D. ; William Watt, W.S. ; and the following Vice-Presidents were elected to serve on Council : Douglas A. Allan, D.SC., F.R.S.E. ; Roland E. Cooper, F.R.S.E., F.R.S.G.S. ; Douglas Guthrie, M.D., F.R.C.S., F.R.S.E. ; Sir Hugh McPherson, K.C.I.E., C.S.I. ; Arthur W. Russell, O.B.E., W.S. ; Principal J. Cameron Smail, O.B.E.

The Chairmen of the Branches were re-elected :—*Glasgow :* Lt.-Col. John Johnston, O.B.E., T.D., M.A. ; *Dundee :* George A. Cumming, M.A., PH.D. ; *Aberdeen :* William Clark Souter, M.B.

The other Office-bearers were re-appointed.

The Chairman thanked the retiring Members of Council who had completed their term of office :—Douglas A. Allan, D.SC., F.R.S.E. ; Robert Rendel Clarke, B.SC. ; Mrs. Annie Cormack ; Edward Wyllie Fenton, M.A., D.SC. ; Alexander Good ; Harold Skelton ; John S. R. Thomson ; Mrs. John Mathieson ; John Anthony, M.C., M.A., B.SC. ; Kirkland C. Craig, M.A. ; Richard T. Currall, M.A. ; Arthur Geddes, D.ÈS L., PH.D. ; Miss Margaret A. O. Russell ; John Wishart, C.B.E., M.A. ; James Y. Erskine, M.A., B.COM., F.R.S.G.S.

The President concluded the meeting with the following remarks :—

The Society has sustained a great loss by the deaths of the late President, Sir D'Arcy Thompson, and, within the past week, of Sir Thomas Whitson, who had served the Society as Treasurer for twenty years and whose wise advice had always been greatly valued.

The Society is composed of members who are interested in geography for a variety of reasons ; but all must be interested in its general progress, and signs of this are not lacking. One of them is the greatly increased number of young geographers now

at the universities—in Edinburgh those aiming at the Honours Degree have increased ten-fold since 1939. Another is the demand by libraries abroad for sets of the *Magazine*—a demand that can now be met only with the help of old members returning volumes.

The field-sciences have suffered, necessarily, during the war. But it is proper to recognise that they, and especially geography, will benefit from two related products of the war—maps and air-photographs. These have been made in vast quantities, and the maps have been improved by use of the air-photographs, so that geographers have now added greatly to their available materials. Fortunately the Society is now the repository of the complete collection of the war-time maps ; nearly all the 60,000 map sheets have arrived and are being arranged. Access to the air-photograph collection held by the R.A.F. will be more difficult, but I hope it will be arranged.

The Society will progress with the science it exists to foster, and in doing so it will probably change its character somewhat in the future. Members will realise the essential quality of geography—that of co-ordination. In the coming session there will be several technical papers read and discussed which will bring this out. Again, for example, we have had the disastrous floods in SE Scotland : occurring, however, too late to be discussed in our present programme. Here is a phenomenon that deserves to be studied as a whole—that is, *geographically*. Only by a properly co-ordinated study can we understand cause and effect, and appreciate, for instance, how much the effects would have been mitigated had the Lammermuirs been under forest.

LECTURE SESSION, 1948-1949

JANUARY–MARCH, 1949

EDINBURGH, *Usher Hall*

EVENING MEETINGS, at 7.30 P.M.

January	13th.	ALEXANDER STEVENS, M.A., B.SC., on " Behind the ' Iron Curtain '." Illustrated.
February	10th.	L. DUDLEY STAMP, C.B.E., B.A., D.SC., on " Planning the Land of Britain for full Production." Illustrated.
March	10th.	PATRICK W. R. PETRIE, O.B.E., M.B., CH.B., on " Yemen." Illustrated.

Central Hall, Tollcross

AFTERNOON MEETINGS—Wednesdays, at 3 P.M.

January	19th.	L. M. HARPER-GOW, on " Antarctic Whaling." Illustrated.
February	2nd.	PETER H. DAVIES, on " In South West Australia." Illustrated.
February	16th.	W. H. MURRAY, on " Scottish Mountains and the Mountaineer." Illustrated.
March	2nd.	ALEXANDER AITKEN, on " The Hosteller Looks at Scotland." Illustrated.
March	16th.	CHARLES A. MALCOLM, PH.D., on " Mediaeval Edinburgh." Illustrated.

Society's Rooms, Synod Hall

TECHNICAL PAPERS

Fridays, at 5 P.M.

January	28th.	W. B. FISHER, PH.D., on " A Monsoonal Effect in the Mediterranean."
February	25th.	Sir FRANK MEARS, P.R.S.A., on " Planning : Central and SE Scotland."
April	8th.	Miss PEGGY M. HOBSON, B.SC., on " Is Crofting becoming Obsolete ? "

NOTE.—The paper by Professor H. J. FLEURE, D.SC., F.R.S., on " Switzerland and its Relation to Problems of Federation," was read on 14th December instead of 25th March as announced in the Prospectus.

DISCUSSIONS

Discussions on Present-Day Problems in their Geographical aspect will be held in the Society's Rooms at 7.30 p.m. on 21st January, 11th February, and 11th March.

GLASGOW, *Lyric Theatre*, at 7.30 p.m.

January	12th.	Alexander Stevens, m.a., b.sc., on "Behind the 'Iron Curtain'." Illustrated.
February	9th.	L. Dudley Stamp, c.b.e., b.a., d.sc., on "Planning the Land of Britain for full Production." Illustrated.
March	9th.	Patrick W. R. Petrie, o.b.e., m.b., ch.b., on "Yemen." Illustrated.

ABERDEEN, *Y.M.C.A. Hall*, at 7.45 p.m.

January	18th.	Alexander Stevens, m.a., b.sc., on "Behind the 'Iron Curtain'." Illustrated.
February	8th.	W. H. Murray, on "Scottish Mountains and the Mountaineer." Illustrated.
March	8th.	Captain P. M. Cran, on "The Island of Cyprus." Illustrated.

DUNDEE, *School of Economics Lecture Hall*, at 7.30 p.m.

January	19th.	Alexander Stevens, m.a., b.sc., on "Behind the 'Iron Curtain'." Illustrated.
February	9th.	W. H. Murray, on "Scottish Mountains and the Mountaineer." Illustrated.
March	9th.	Captain P. M. Cran, on "The Island of Cyprus." Illustrated.

NEWBIGIN PRIZE: 1949 AWARD

A Bronze Medal and Money Prize will be awarded for the best Essay, suitable for publication in *The Scottish Geographical Magazine* and not exceeding 7000 words in length, on any subject relating to the geography of Scotland.

Essays, typed and with any illustrations suitable for reproduction, in envelopes marked "Newbigin Prize," must be lodged with the Secretary, Royal Scottish Geographical Society, Synod Hall, Edinburgh 1, on or before October 31st, 1949.

NOTICE

The response to the previous appeal for spare copies of issues of *The Scottish Geographical Magazine* now out of stock is gratefully acknowledged, but was quite inadequate to meet the growing demand for entire sets.

All bound volumes are acceptable, especially those from 1911 (Vol. **27**) to the present day.

For the completion of sets, the following numbers are very urgently required :—

Vol. **2**, No. 3; **13**, No. 11; **20**, Nos. 1, 5, 6, 7; **22**, No. 6; **25**, No. 8; **26**, No. 3; **34**, Nos. 3, 4, 5, 6, 7, 9, 10, 12; **35**, Nos. 1, 2, 3, 4, 5, 8, 9; **36**, Nos. 1, 4; **37**, Nos. 1, 2, 4; **40**, Nos. 2, 3; **41**, Nos. 1, 2, 6; **47**, No. 6; **52**, No. 6; **58**, Nos, 1, 2, 3; **59**, Nos. 1, 2, 3; **60**, No. 2; **61**, No. 2; **62**, No. 3.

It would be much appreciated if such copies of volumes and of separate numbers be handed to the Secretary.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

REPORT OF COUNCIL

Sixty-Fourth Session, 1947-48

1st July 1947 to 30th June 1948

The Council have the honour to submit the following Report :—

Membership

The changes during the Session are as follows :—

On the Roll at 1st July 1947		1942
New Members		255
		2197
Deduct by Death	48	
,, Resignation	308	
		356
On the Roll at 30th June 1948		1841

The total Membership is analysed thus :—

Edinburgh Ordinary	846	Edinburgh Corporate (Schools)	13
Glasgow Ordinary	371	Glasgow Corporate (Schools)	26
Dundee Ordinary	54	Aberdeen Corporate (Schools)	1
Aberdeen Ordinary	82	Dundee Corporate (Schools)	2
Honorary Members	5	Life Members	216
Outside Area Members	139	Associates	86

Medal Awards

The Livingstone Medal was awarded to Captain Ejnar Mikkelsen for his life-long promotion of Arctic exploration and his devoted service to the people of East Greenland.

The Mungo Park Medal was awarded to Lt.-Col. F. Spencer Chapman for his contributions to geographical knowledge.

The Scottish Universities Medal was awarded to :—

Miss Sheila Mary Ellis, First Place, General Classes 1947-48, St. Andrews University ; Miss Elizabeth K. C. Marchbank, for distinguished work in the Junior Honours Class 1947-48, Glasgow University ; John Morland Craig, First Place, Ordinary Class 1947-48, Aberdeen University ; Archibald MacPherson, First in Geography (First Course) 1947 and in Geography (Second Course) 1948, Edinburgh University.

Meetings of the Society

The Society held forty-one meetings during the session : In Edinburgh, six Evening Lectures in the Usher Hall, twelve Wednesday Afternoon Lectures in the

Lothian Road Church Hall, three Special Lectures, two in the Society's Rooms and one in the Lothian Road Church Hall, and two Film Shows in the Synod Hall during the Christmas Holidays.

Six lectures were held in the Lyric Theatre, Glasgow, six in the School of Economics Lecture Hall, Dundee, and six in the Y.M.C.A. Hall, Aberdeen. The lectures are listed in the *S.G.M.*, Vol. 63, pages 95 and 96, 159 and 160. Alterations to the lectures listed appear in the September 1948 issue of the *Magazine*.

Library and Map Department

During the session 3500 books and 207 map and chart sheets were issued to members.

The following additions were made :—266 books ; 428 map and chart sheets ; 19 reports and 36 pamphlets ; 36 books were presented by members and 24 purchased.

In addition, approximately 20,000 maps were received from the Directorate of Military Survey, War Office. The Society has been able to obtain the use of another room (Room 31) in the Synod Hall, and the work of arranging the maps is in progress.

The Geographical Section, General Staff, War Office, has intimated that the Society will, in future, be on the list of those to whom free issue of G.S.G.S. publications is made.

Presentations.—The Council thank the Director General of the Ordnance Survey for their most recent publications, including the new series, 1 : 25,000 ; R. P. Matthewson for 25 volumes of the *S.G.M.* ; E. H. C. Walsh for a framed photograph of Lhasa ; Miss I. C. Grieve for a framed engraving of Capt. Cook ; H. M. Paton for three volumes on Orkney published by the Ancient Monuments Commission ; Lt.-Col. G. Dalyell of the Binns, Miss J. D. Scott and Miss Ella Christie for collections of lantern slides ; the Scottish Mountaineering Club for a collection of lantern slides ; the Director, Royal Scottish Museum, for 938 volumes from the Museum Library—these books, many on travel or exploration, are now being added to the Society's Library in Glasgow ; also the following for books :—Erik Schacke ; Gilbert Grosvenor ; H. M. Paton ; Bjarne Aagaard ; Prof. R. N. Rudmose Brown ; John Bartholomew ; W. G. V. Balchin ; J. Thomas and Vernon Hood ; Mrs. Blackadder ; H. H. Read ; George Dott ; Lucien Gachon.

The Scottish Geographical Magazine

It was not feasible to revert to the pre-war number of issues annually, and three numbers of *The Scottish Geographical Magazine* have again been published during the year. However, the number of pages in Volume 63 was increased, and, in order to permit a reversion to larger and more legible type, a further enlargement became necessary in Volume 64. It has been possible, therefore, to augment the text. The number of reviews is an indication of the liberality of publishers in sending review copies, and the Society appreciates the maintenance of the inflow of current publications.

The Council desire to record their obligations alike to the authors of articles and to the following, who have assisted the work of the Editors by contributing reviews and in other ways :—C. Aldred, M. Aurousseau, Miss B. D. Baker, J. C. Bartholomew, the Master of Belhaven, W. Brotherston, Prof. R. N. Rudmose Brown, Capt. A. Buchanan, Dr. W. Burns, R. E. Cooper, Dr. J. Macqueen Cowan, Dr. R. M. Craig, R. T. Currall, Dr. A. I. Dunlop, J. Y. Erskine, S. C. Farrar,

Dr. Arthur Geddes, Commdr. C. R. V. Gibbs, A. T. Gibson, Dr. R. Maclagan Gorrie, Dr. D. Guthrie, A. Harrison, Dr. G. Pratt Insh, Tyge Lassen, Miss M. G. Leitch, the late W. O. Leitch, Dr. A. M. Limont, H. C. Maitland, Miss J. R. Manson, Dr. R. Miller, D. G. Moir, Prof. A. G. Ogilvie, Dr. R. Piddington, Prof. Stuart Piggott, R. M. Prothero, Rev. James Reid, Dr. C. J. Robertson, E. Schacke, Dr. C. P. Snodgrass, F. D. N. Spaven, Dr. J. B. Tait, R. R. Walls.

Donations

During the year Mrs. M. E. Richardson, widow of Ralph Richardson, a former Honorary Secretary of the Society, died, and under the terms of Mr. Richardson's Will the Society has received from his Trustees the sum of £25,689, 15s. 7d., bequeathed to the General Funds of the Society, and this has been invested in Government Stocks. A further sum will be received when his Estate is wound up.

The other donations to the General Fund of the Society, received during the year, amounted to £290, 18s. 2d., of which the following were made under covenant :—£90, 18s. 2d. anonymously, and £100 from the late Dr. James Watt's Trustees. The late Miss Julia Blanchard bequeathed a legacy of £100 free of legacy duty.

Staff

Mr. George Walker retired from the post of Secretary on the completion of 50 years' service with the Society, but for the period of one year will continue in the office of Librarian. The Council have appointed Captain J. F. W. Hawkins, R.N. (Retd.), to succeed him.

The Society's Representatives

The following Members were appointed to represent the Society :—

Association for the Preservation of Rural Scotland.—Sir Hugh McPherson ; Lt.-Col. John Johnston.

Scottish Council for National Parks.—Lt.-Col. Gordon Dalyell of the Binns.

Bruce Memorial Prize Committee.—James M. Wordie ; Prof. R. N. Rudmose Brown.

Carnegie United Kingdom Trust—General Council of the Central Library for Students.—Robert R. Walls.

Joint Committee for Anthropological Research and Training.—Robert Kerr.

National Committee for Geography.—John Bartholomew.

National Trust for Scotland.—Professor Alan G. Ogilvie.

Permanent Committee on Geographical Names.—John Bartholomew.

Scottish National Memorial to David Livingstone.—Lt.-Col. John Johnston.

Exhibition

The Society's Exhibition, " Early Scottish Maps and Travel," held in the Society's Rooms, in conjunction with the Edinburgh Festival 1947, was opened by the Lord Provost on 21st August 1947. The interest aroused was so great that the date of closing was deferred until the end of October 1947.

Obituary

It is with deep regret the Council record the loss to the Society of 48 Members by death, among them Sir D'Arcy W. Thompson, C.B., D.C.L., D.LITT., F.R.S., late President ; Sir Robert B. Greig, LL.D., F.R.S.E., a Vice-President and Trustee ; William O. Leitch, M.I.C.E., F.R.S.E., a past Hon. Treasurer and Vice-President.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

ORDINARY REVENUE AND EXPENDITURE ACCOUNT

For Year to 30th June 1948

REVENUE

Subscriptions :—		
Ordinary	£1,937 5 3	
Schools Corporate	108 15 0	
	£2,046 0 3	
Life Membership Fees :—		
Portion applicable to Revenue	80 9 9	
Government Grant	200 0 0	
General Donations	193 7 9	
Dividends and Interests	265 19 1	
	£2,785 16 10	
Deficit for Year	448 1 3	
	£3,233 18 1	

EXPENDITURE

Magazine—Expenses of Publications :—			
Printing			£540 2 10
Editor			85 0 0
Illustrations			233 10 10
Wrappers, Index and Miscellaneous			99 3 4
Postages			58 13 1
			£1,016 10 1
Less—Magazines sold	£247 7 7		
Advertisements	34 10 0		
		281 17 7	
		£734 12 6	
Rooms—Upkeep of :—			
Rent, Rates and Insurance	£221 15 1		
Cleaning and Repairs	156 0 6		
Heating and Lighting	41 17 2		
	£419 12 9		
Less—Donations	98 10 0		
		321 2 9	
Lectures	£730 19 1		
Less—Received for Tickets sold	137 6 0		
		593 13 1	
Salaries			875 5 5
Auditor's Fee			15 15 0
Superannuation Contributions			117 14 8
Library—Books, Maps and Furnishings			76 1 0
Provision for Current and Deferred Expenditure			—
General Printing			124 6 0
Stationery			66 5 1
Telephone and Telegraphic Address			13 13 0
Addressograph			12 10 11
Medals			16 4 0
Postages			97 4 1
Donations			4 4 0
Miscellaneous			106 18 8
Exhibition—Early Maps :—			
Expenses	£60 5 5		
Less—Sale of Catalogues	1 17 6		
		58 7 11	
		£3,233 18 1	

BALANCE SHEET as at 30th June 1948

ASSETS

I. Investments—			
£400 3% Defence Bonds			£400 0 0
£350 2½% do.			350 0 0
£5,000 2½% National War Bonds 1952-54			5,116 8 6
£5,000 do. do. 1954-56			5,114 17 3
£2,500 3% National Defence Loans 1954-58			2,613 2 0
£2,000 3% War Loan 1955-59			2,100 8 0
£5,000 3% Savings Bonds 1955-65			5,166 8 6
£4,106, 3s. 3d. do. 1965-75			4,173 17 4
£5,500 3½% Conversion Stock 1961			5,772 13 6
£890 2¾% Guaranteed Land Stock			500 13 6
		£31,308 8 7	
II. Sundry Debtors		22 15 0	
III. Cash in Bank and on Hand		542 15 6	

LIABILITIES

I. Accounts Outstanding			£23 6 3
II. Prepaid Subscriptions			9 12 0
			£32 18 3
III. Reserves—			
Glasgow Equipment Fund—Balance at 30th June 1947.	£80 4 0		
Less—Books purchased sent to Glasgow	20 0 0		
	£60 4 0		
Reserve for Current and Deferred Expenditure, for Books, Maps, Atlases, Binding Equipment, Furnishings and Exhibitions	920 0 0		
		980 4 0	
IV. Funds of the Society—			
(*a*) Life Membership Fund—			
Balance at 30th June 1947	£1,343 10 0		
Sums received during year	266 8 0		
Surplus on realisation of investments	208 2 11		
	£1,818 0 11		
Less—Sum transferred to Revenue Account	80 9 9		
	£1,737 11 2		
(*b*) Dr. J. G. Bartholomew Fund	1,000 13 6		
(*c*) J. E. Touche Bequest—			
Balance at 30th June 1947 £500 0 0			
Surplus on realisation of investments 108 1 4			
	608 1 4		
(*d*) Ralph Richardson Bequest received during year	25,689 15 7		
	£29,036 1 7		
(*e*) General Funds, including Bequests from T. F. Thompson, Dr. J. Currie, J. D. Munro, J. Bentley Philip, A. Geddes Scott, Miss Morrison and R. T. Skinner—			